FIG. 1A

FIG. 1B

FIG. 1C

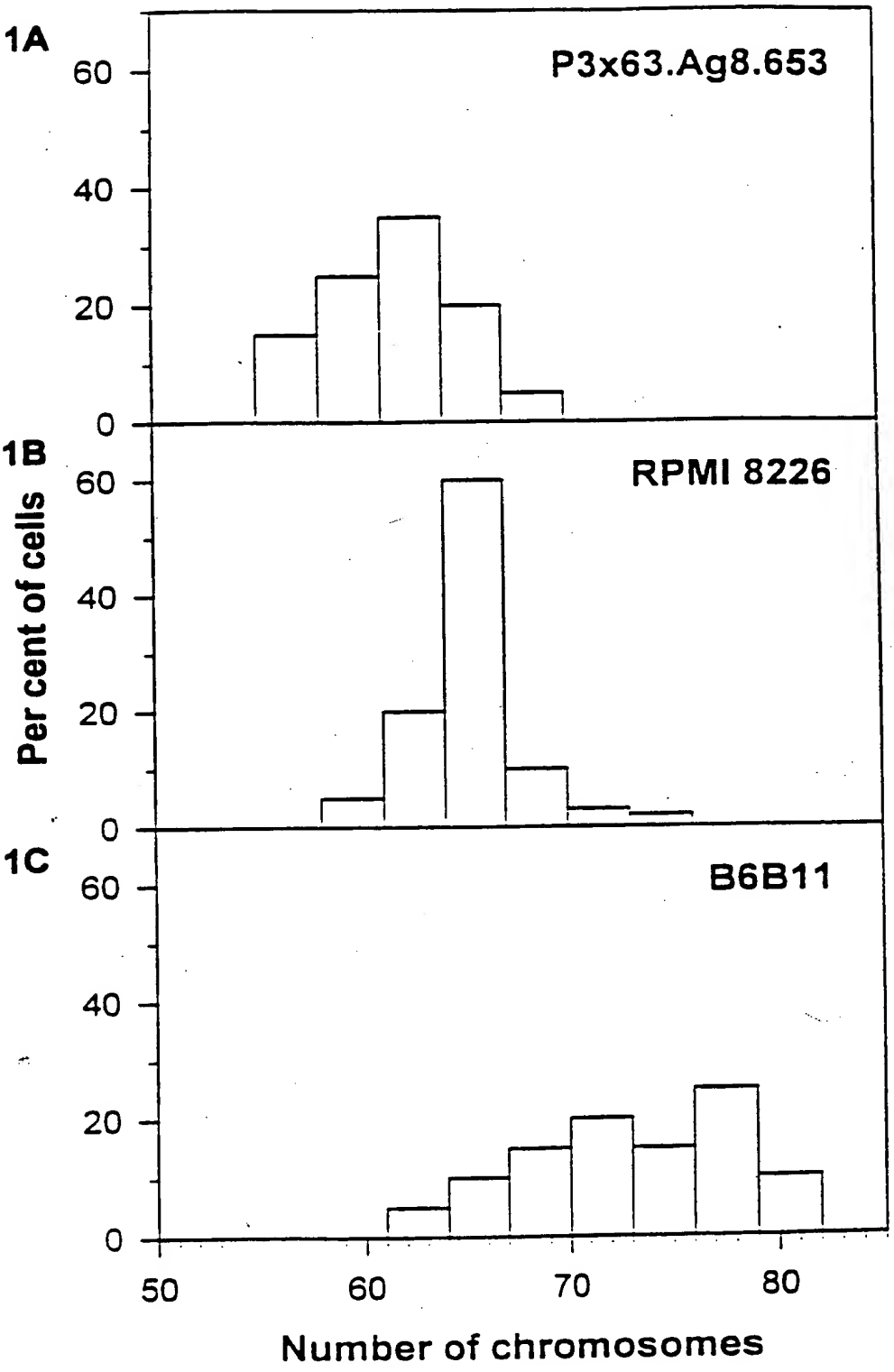


FIG. 2

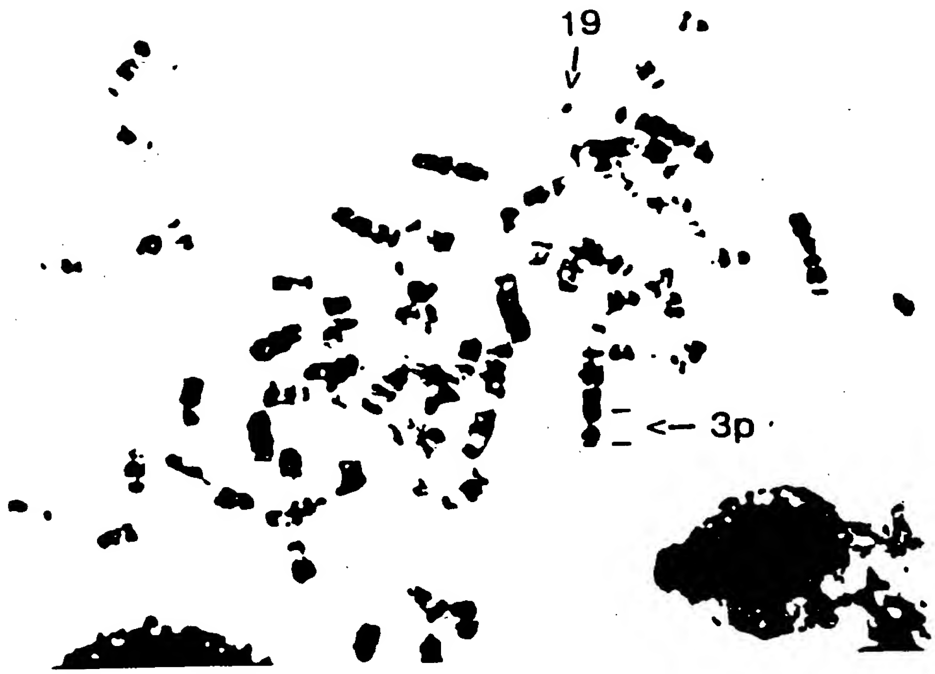


FIG. 3

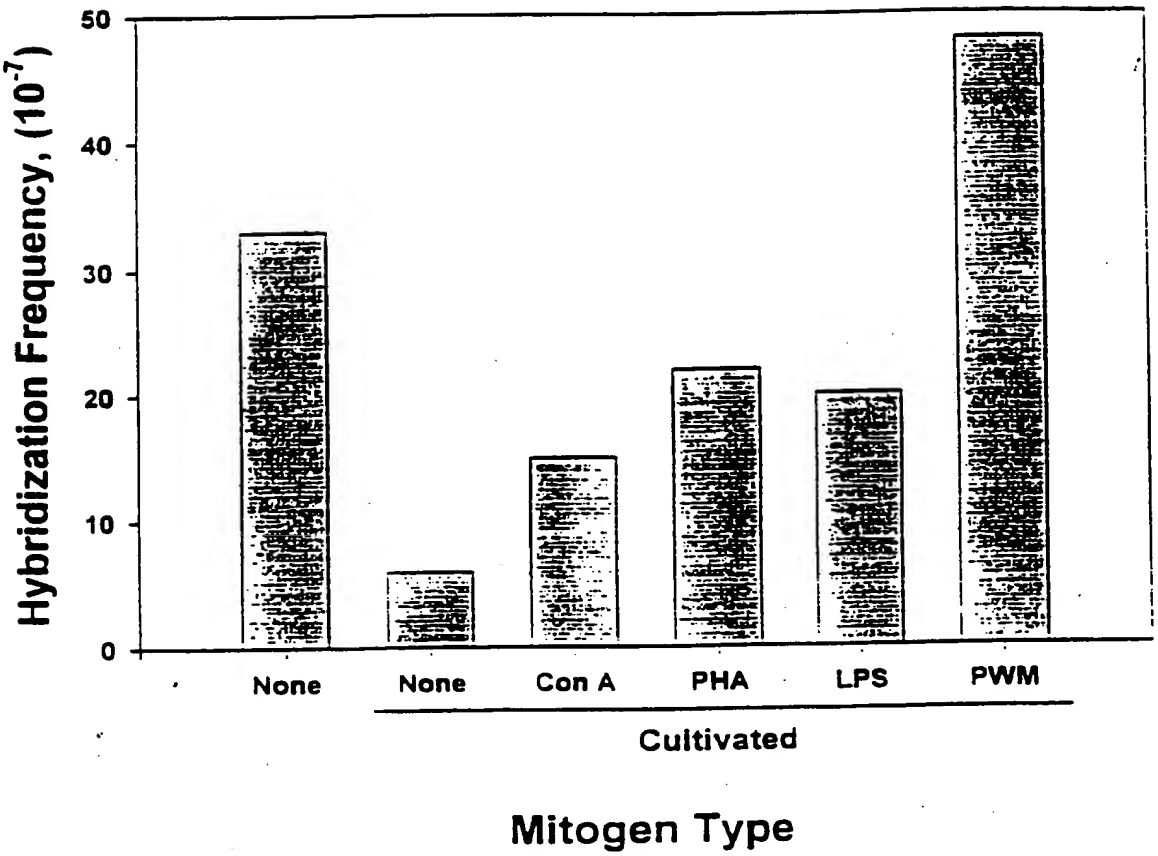

Hybridization Frequency, (10^{-7})
50
40
30
20
10
0
None
None
Con A
PHA
LPS
PWM
Cultivated
Mitogen Type

FIG. 4A

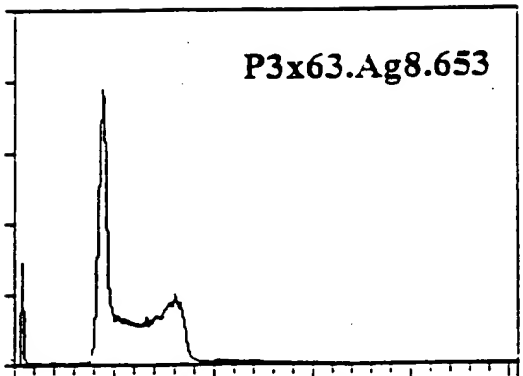


FIG. 4B

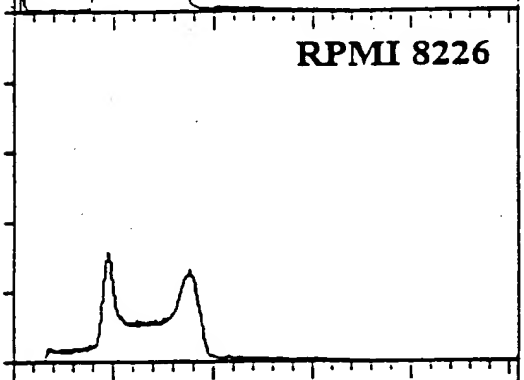


FIG. 4C

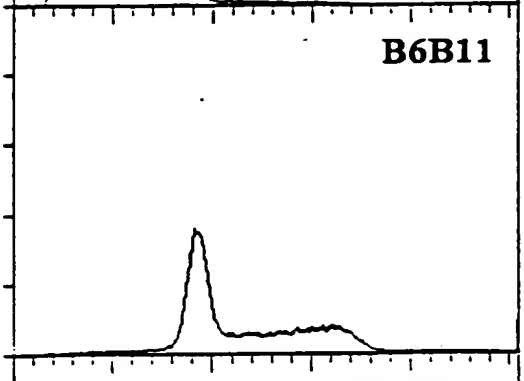


FIG. 4D

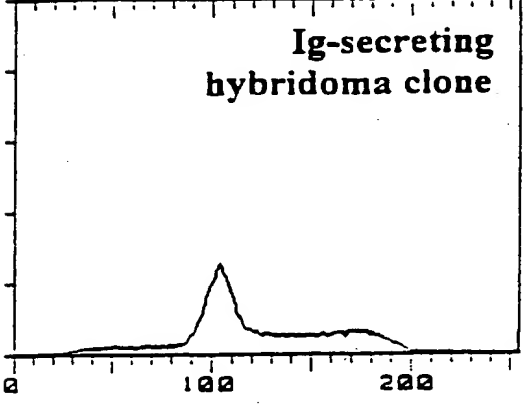


FIG. 5A

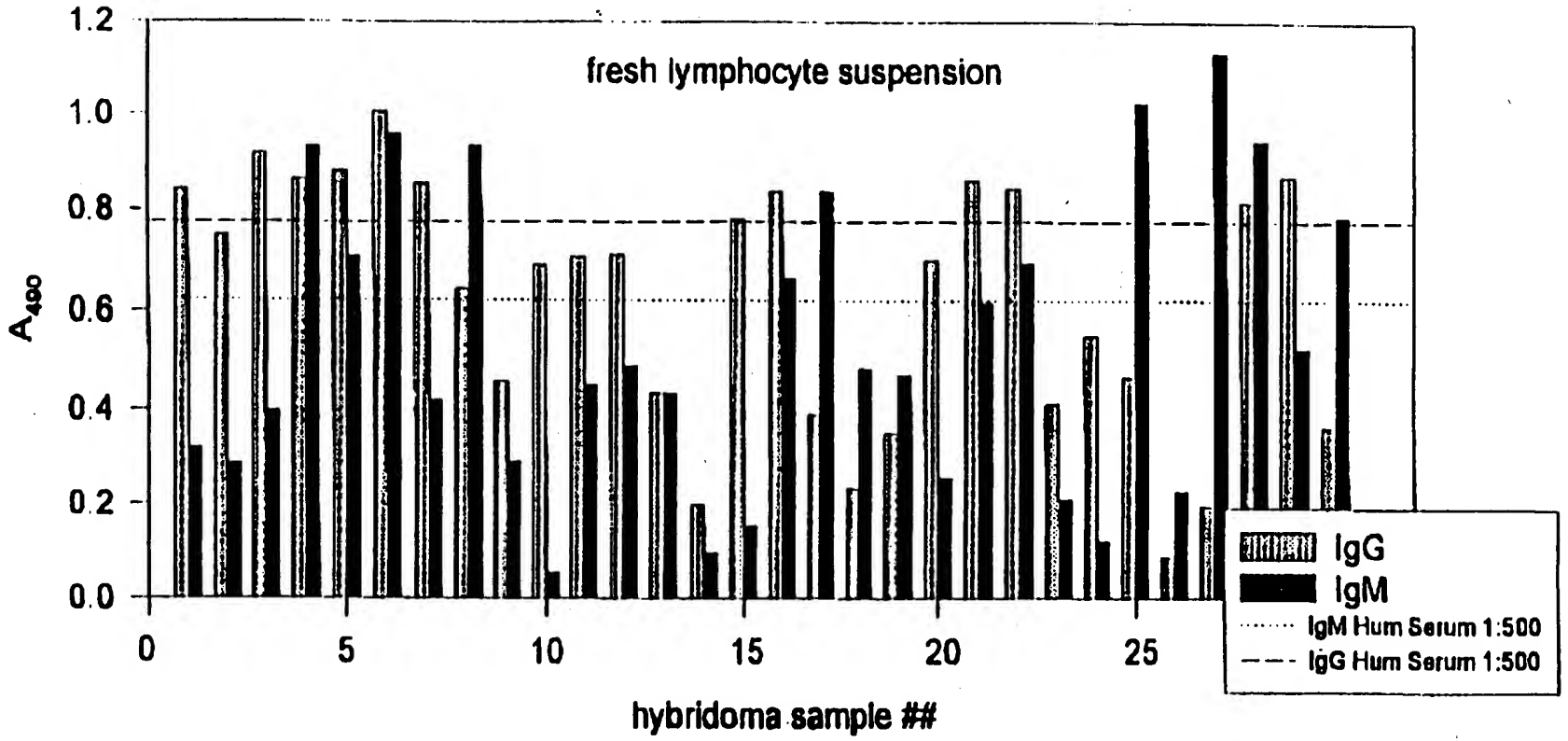
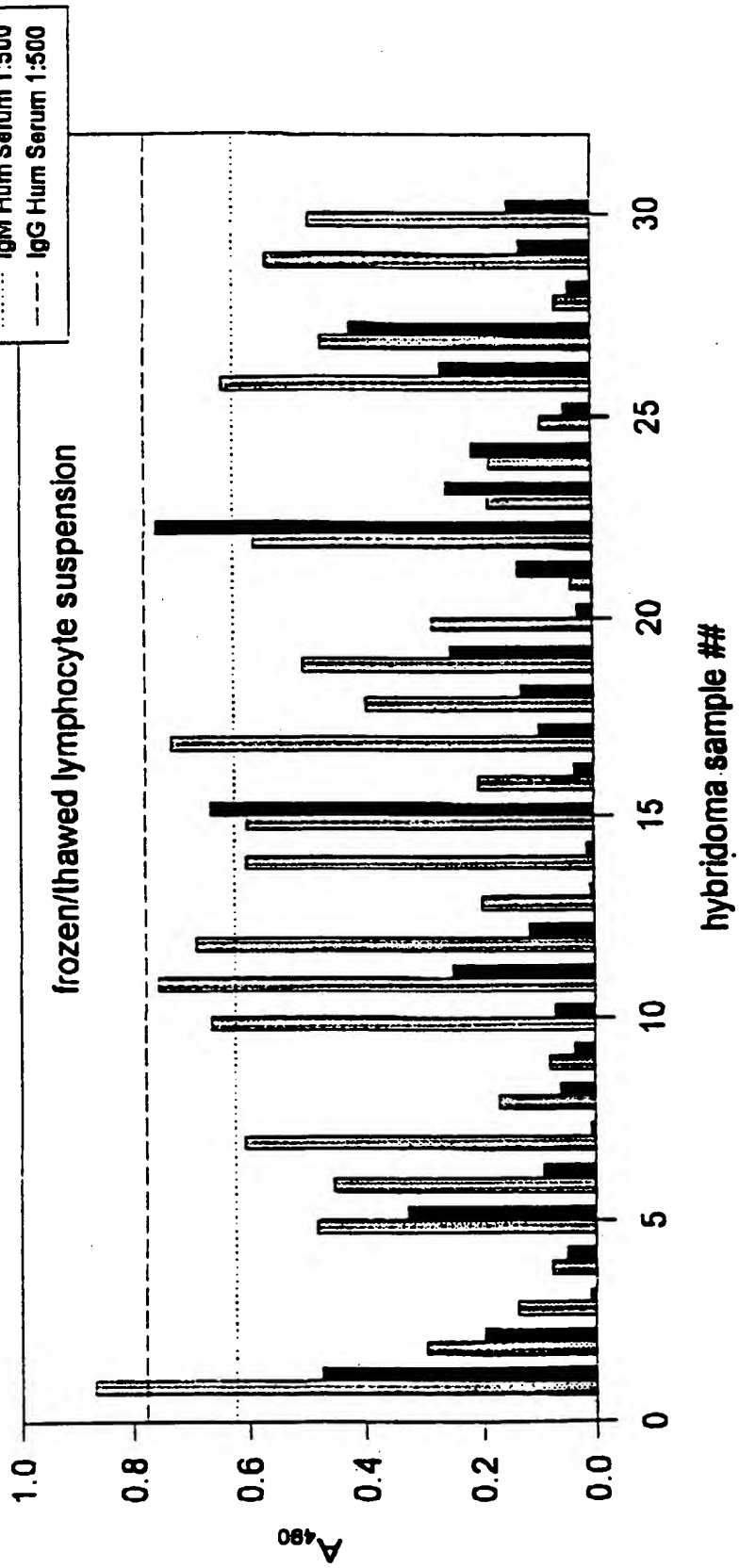


FIG. 5B


IgG
IgM
IgM Hum Serum 1:500
IgG Hum Serum 1:500
frozen/thawed lymphocyte suspension
A_{480}
1.0
0.8
0.6
0.4
0.2
0.0
0
5
10
15
20
25
30
hybridoma sample ##

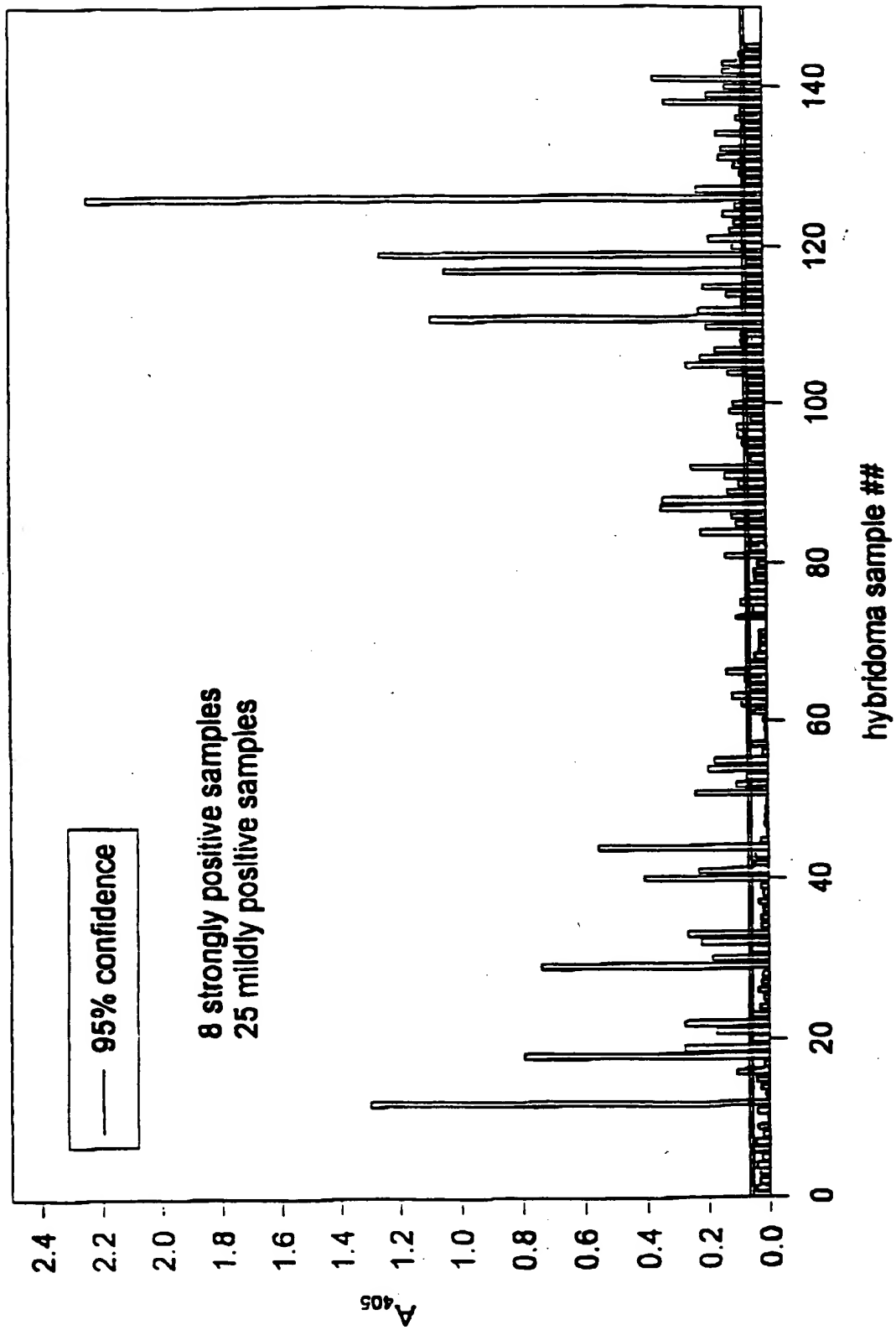

95% confidence
8 strongly positive samples
25 mildly positive samples
A_{405}
hybridoma sample ##
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
0
20
40
60
80
100
120
140

FIG. 6

FIG. 7

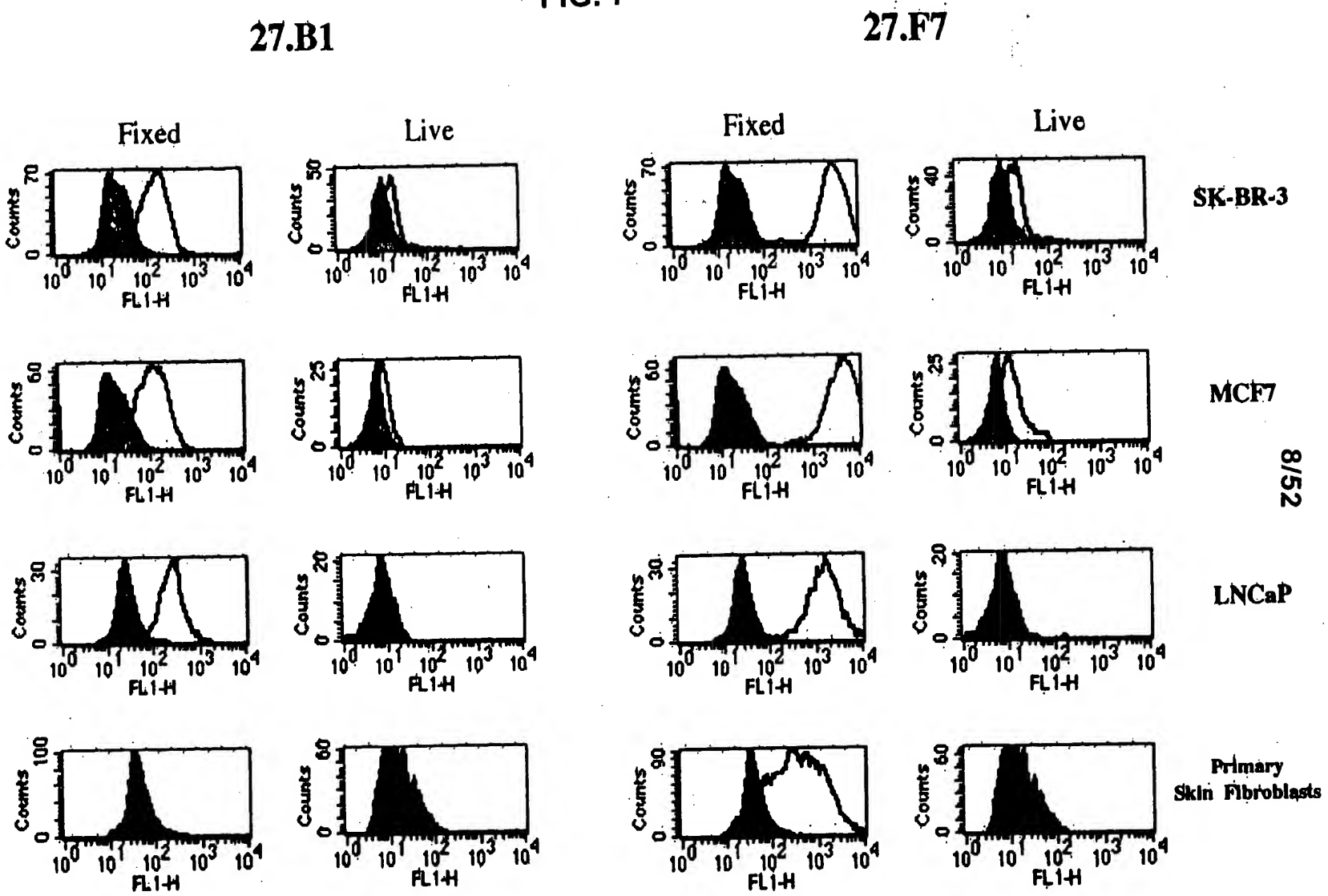


FIG. 8

Expression of 27.F7 and 27.B1 Antigen on Different Human Cell Lines

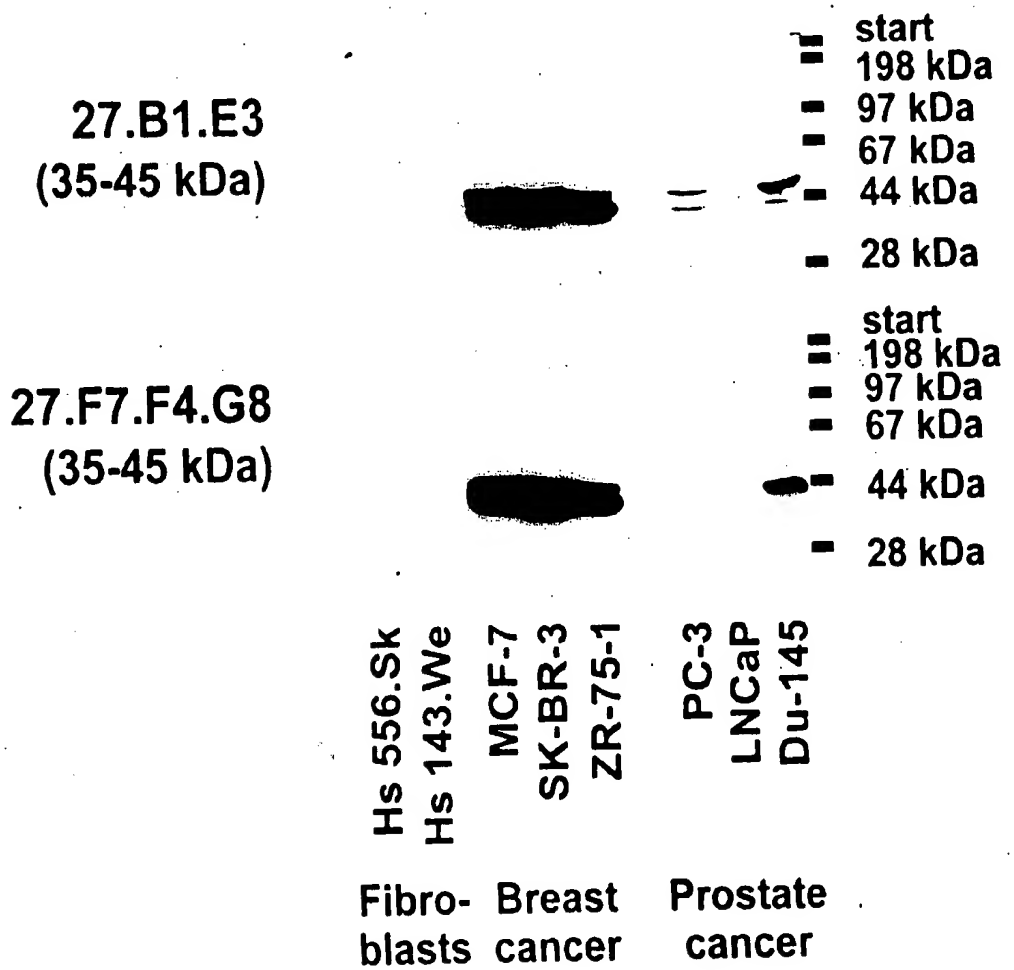


FIG. 9

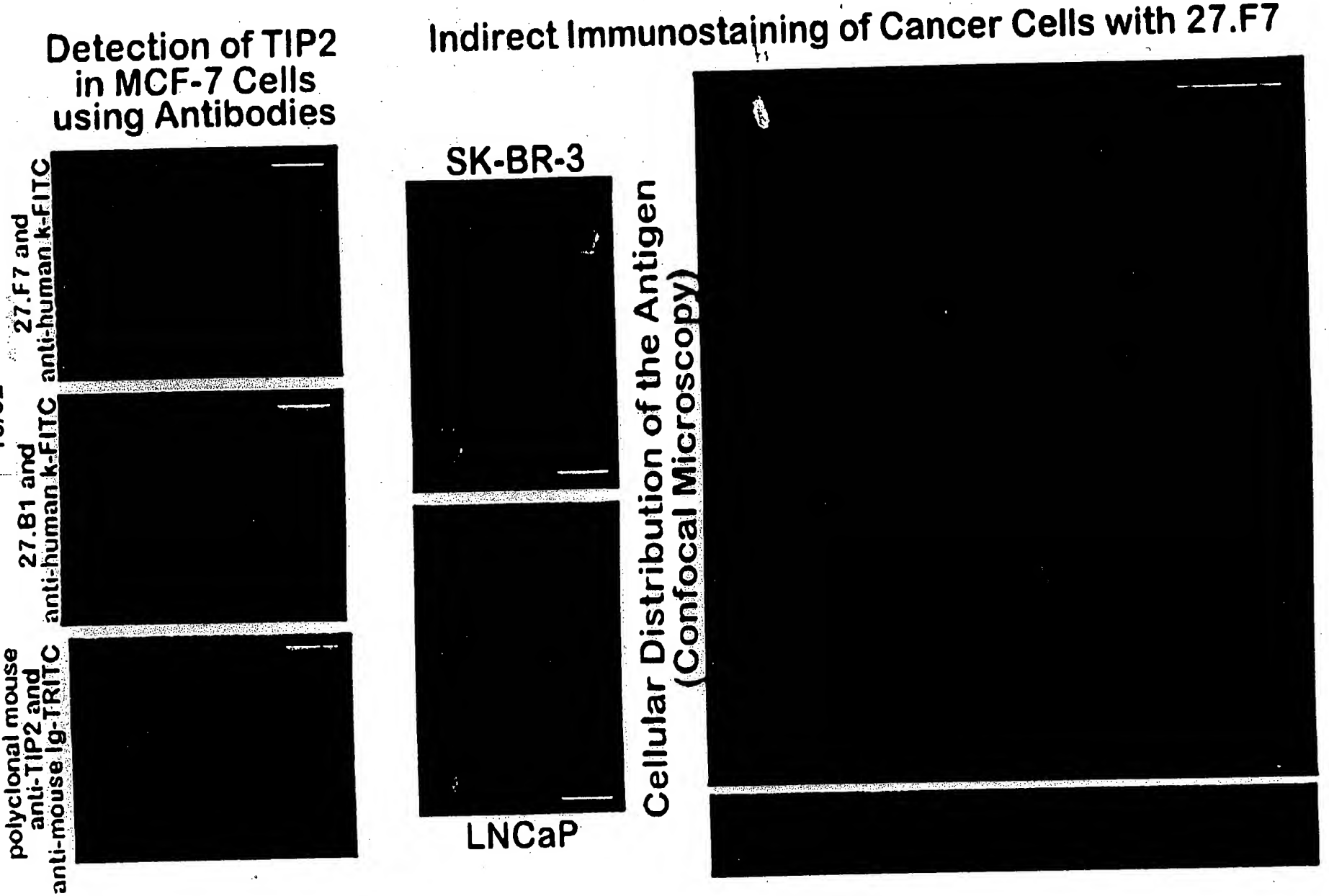
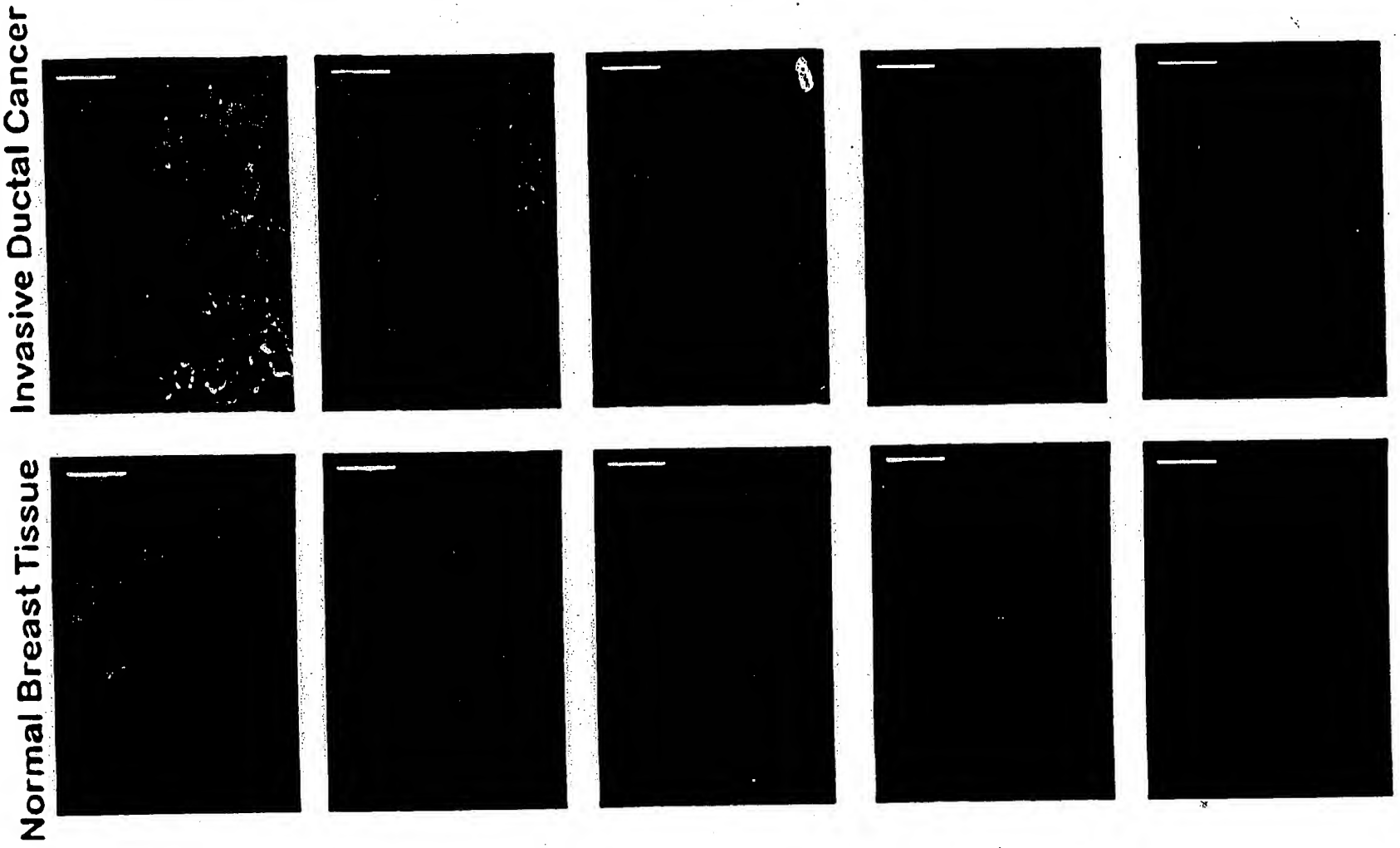

Detection of TIP2 in MCF-7 Cells using Antibodies
Indirect Immunostaining of Cancer Cells with 27.F7
27.F7 and anti-human k-FITC
27.B1 and anti-human k-FITC
polyclonal mouse anti-TIP2 and anti-mouse Ig-TRITC
SK-BR-3
LNCaP
Cellular Distribution of the Antigen (Confocal Microscopy)
Size bars represent 20 µm

FIG. 10

Indirect Immunostaining with 27.B1



Size bars represent 20 μm

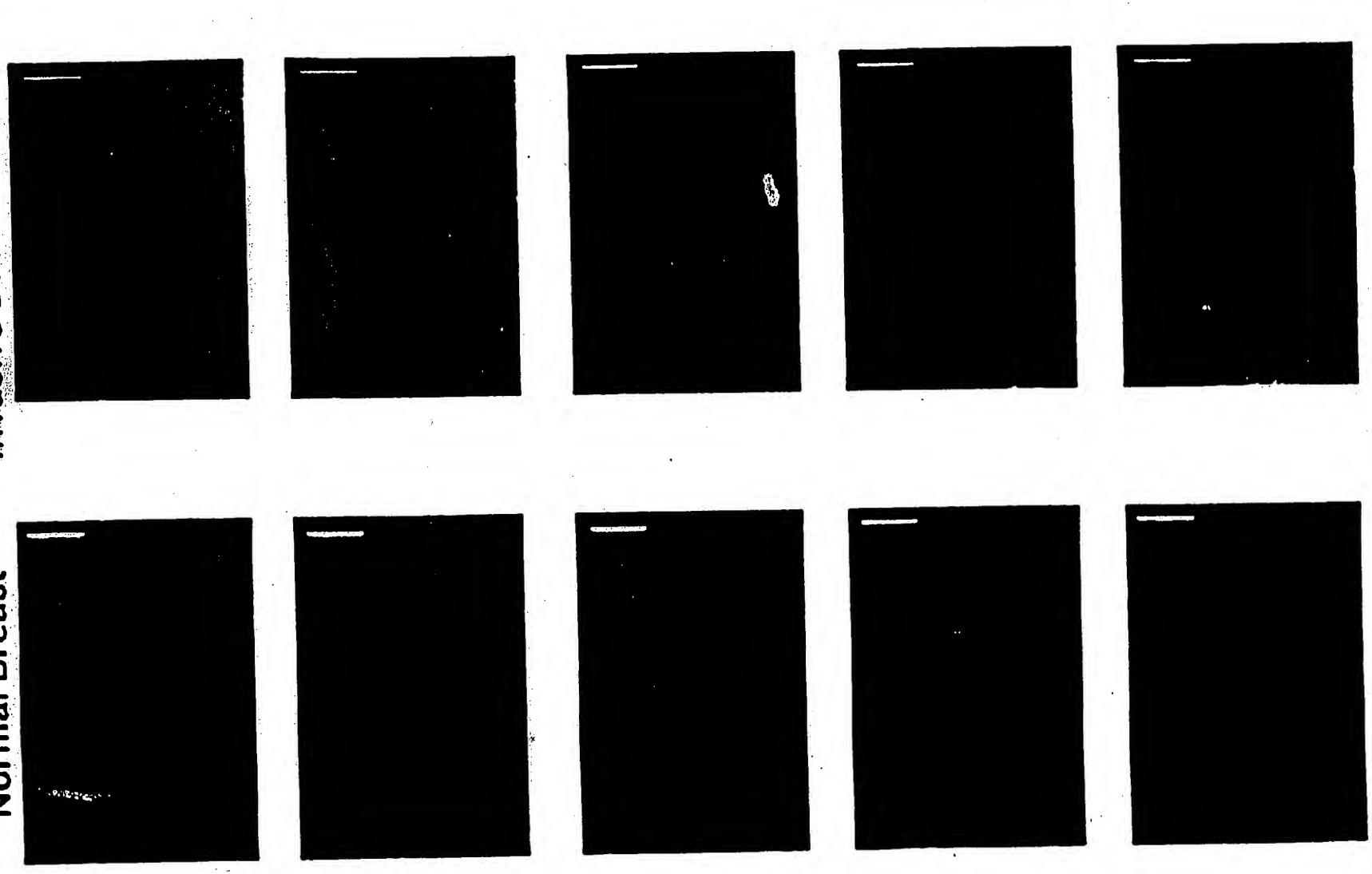
FIG. 11

Indirect Immunostaining with 27.B1

Size bars represent 20 µm

FIG. 12

Indirect Immunostaining with 27.F7



Size bars represent 20 µm

FIG. 13

Indirect Immunostaining with 27.F7

Size bars represent 20 µm

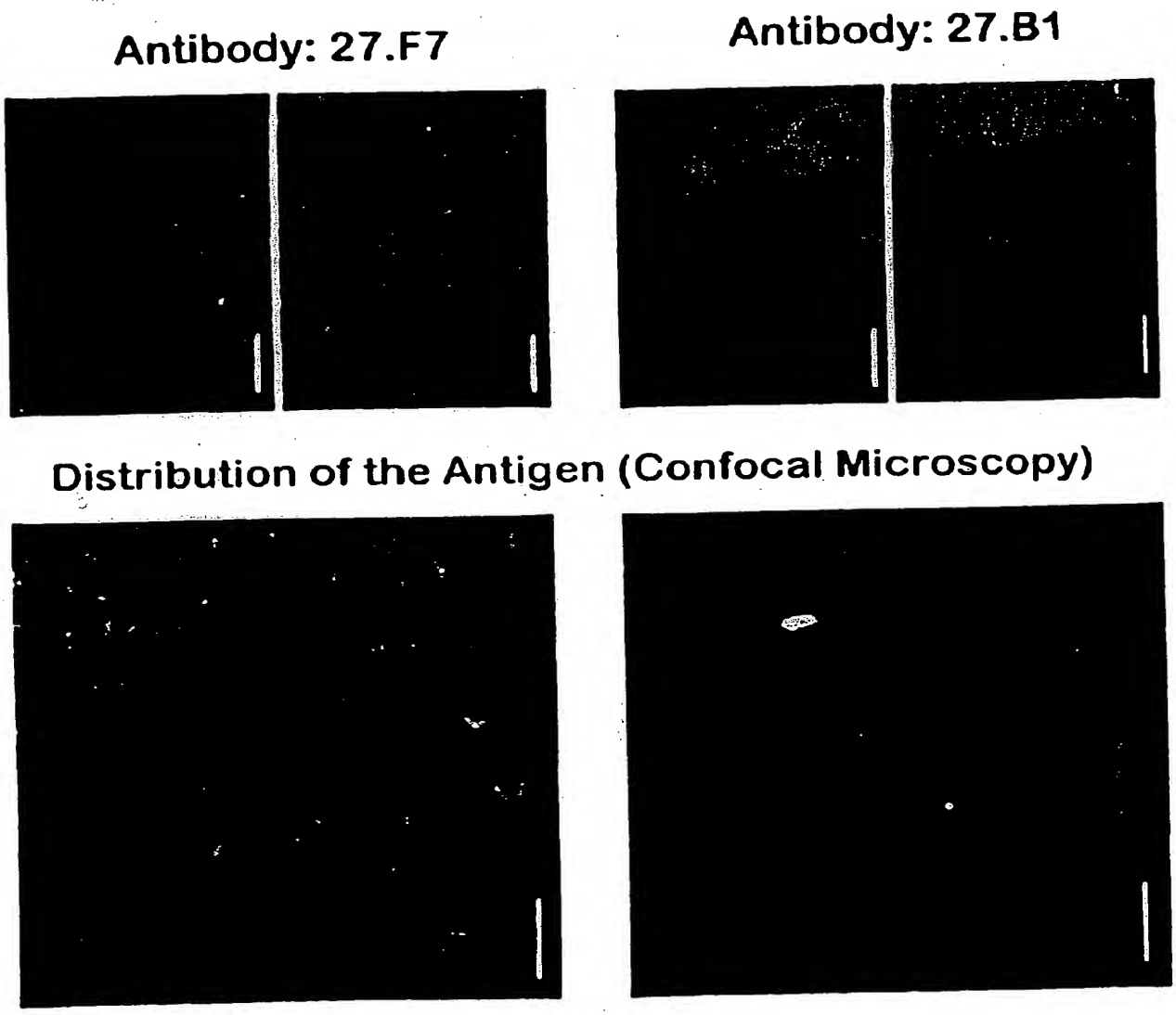
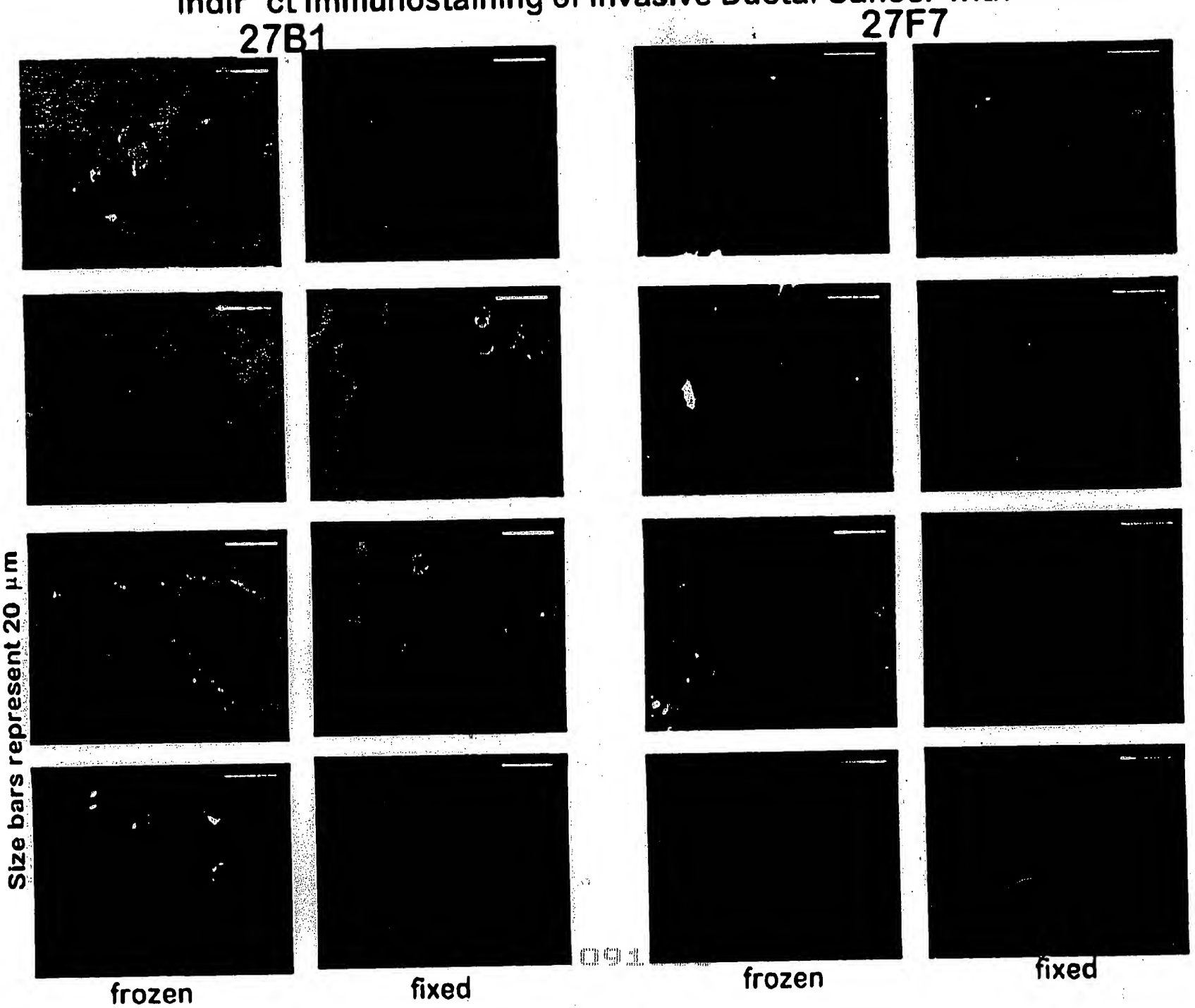


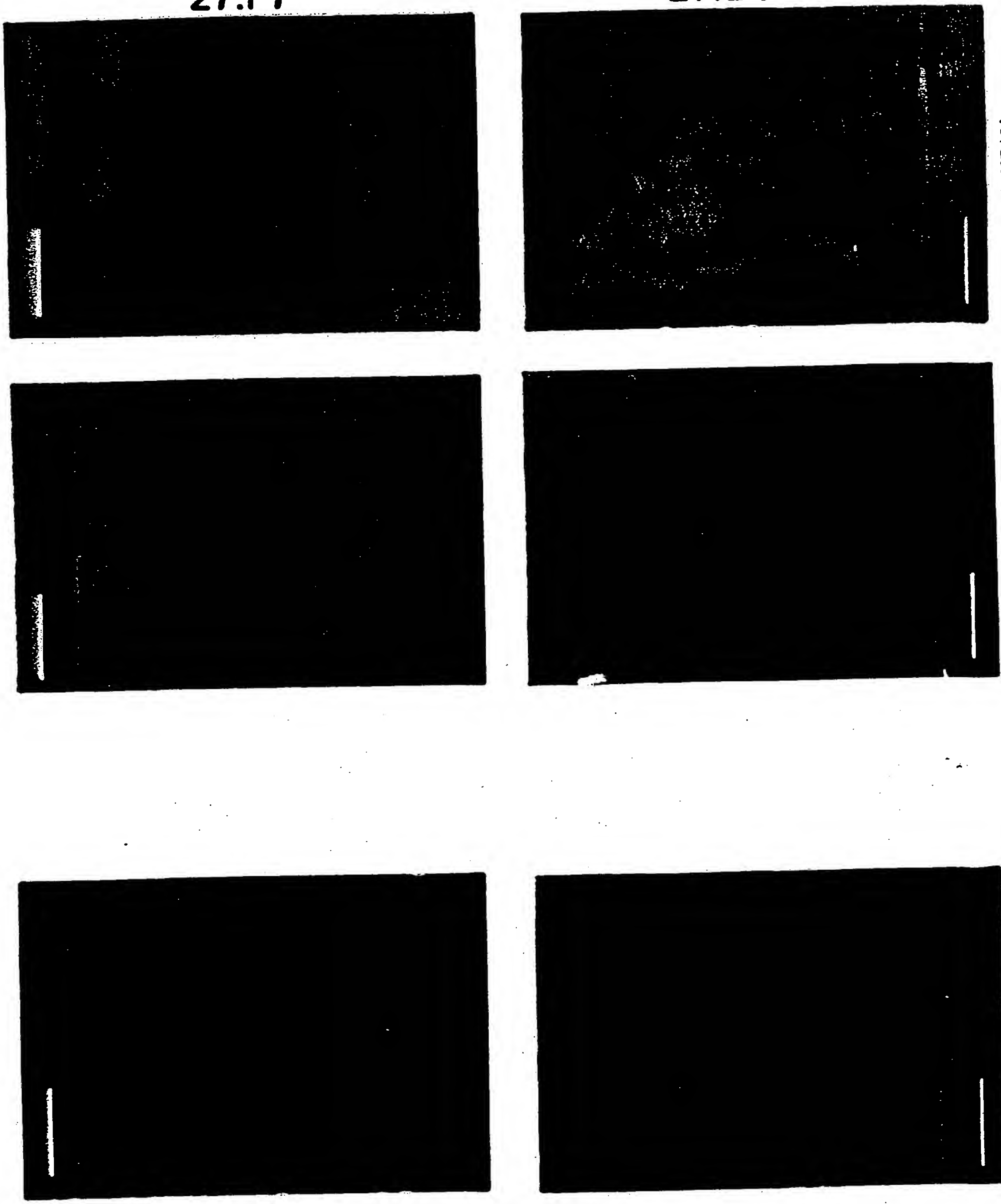
FIG. 14
Immunostaining of Breast Cancer Metastases
in Regional Lymph Nodes

FIG. 15

Indir ct Immunostaining of Invasive Ductal Cancer with



27.F7 27.B1



Male intraductal carcinoma

Size bars represent 20 µm

FIG. 17

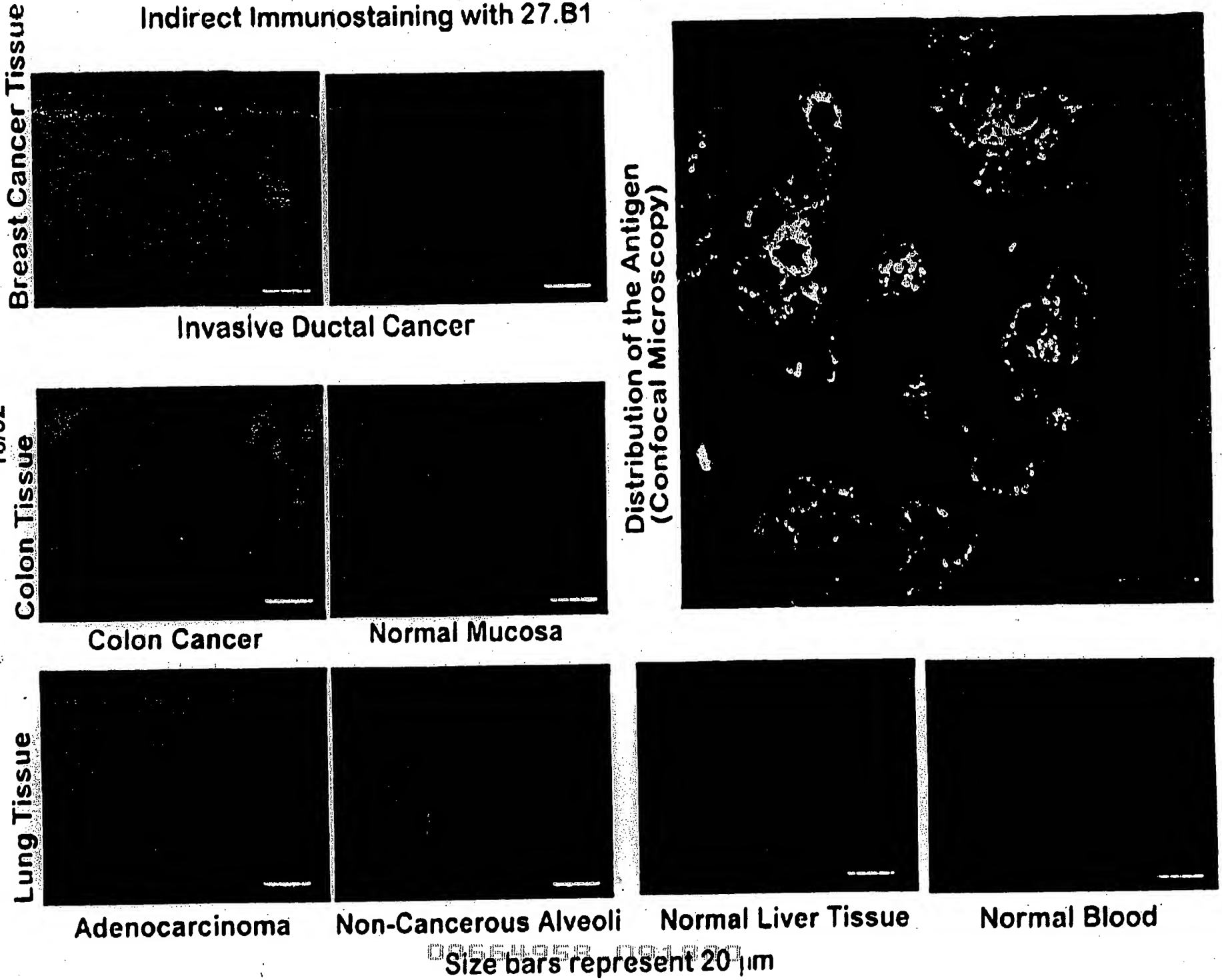

Indirect Immunostaining with 27.B1
Breast Cancer Tissue
Invasive Ductal Cancer
Colon Tissue
Colon Cancer
Normal Mucosa
Distribution of the Antigen (Confocal Microscopy)
Lung Tissue
Adenocarcinoma
Non-Cancerous Alveoli
Normal Liver Tissue
Normal Blood
Size bars represent 20 µm

FIG. 18

Regulation of G-protein Signaling System

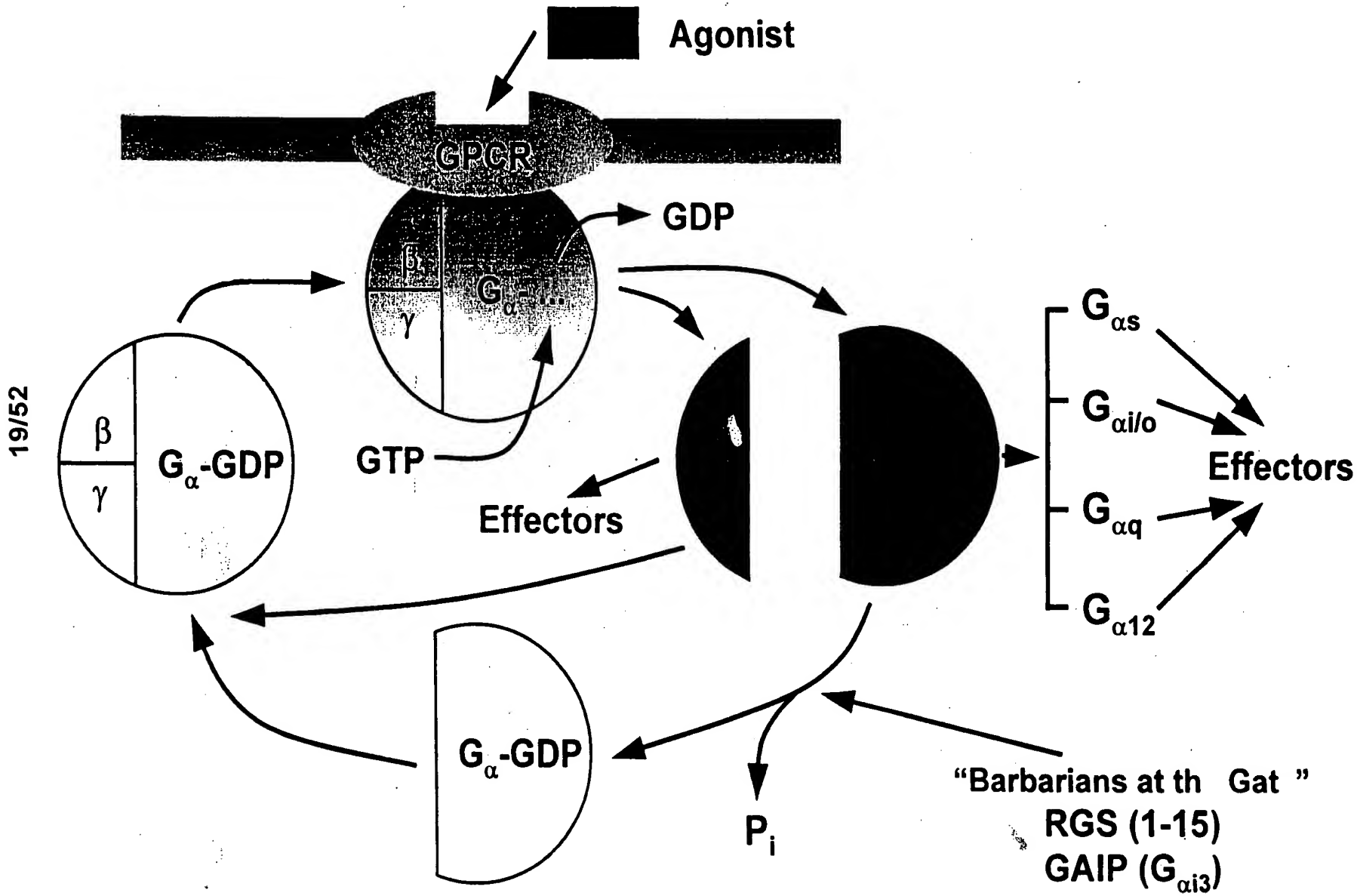
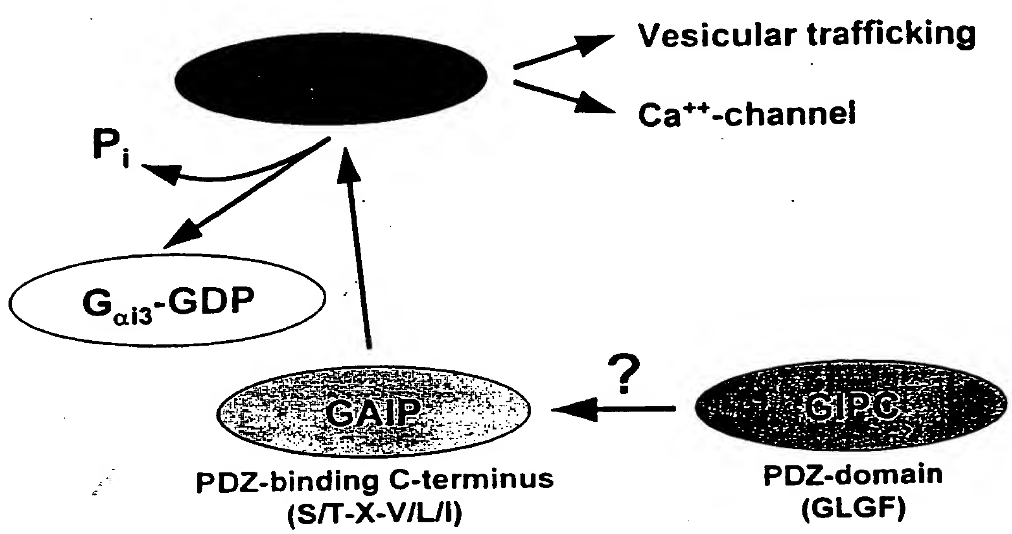


FIG. 19 GIPC Proteins (GAIP Interacting Protein, C-terminus) - Regulators of Regulators?



GIPC Family Proteins

- TAX interacting protein 2 (TIP-2)
- Neurophilin binding protein (NIP)
- M-Semaphorin F cytoplasmic domain associated protein (SEMCAP-1)

Other PDZ-"binders"

- NMDA
- TAX oncoprotein
- HPV E6
- AdD9 E4
- glycophorin C
- FAS
- APC
- LET-23
- CXCR2 (IL-8 RB)
- CXCR5 (coreceptor HTLV-1/HIV)

Other PDZ-"containers"

- PSD-95
- DlgA/DLG
- ZO-1
- p55
- LIN7
- PTPL1/FAP1
- RGS12
- PDZ-73 (NYCO38)

FIG. 20

PRINCIPLE OF SEROLOGICAL RECOMBINANT EXPRESSION CLONING (SEREX) TECHNOLOGY FOR IDENTIFICATION OF TUMOR ASSOCIATED ANTIGENS

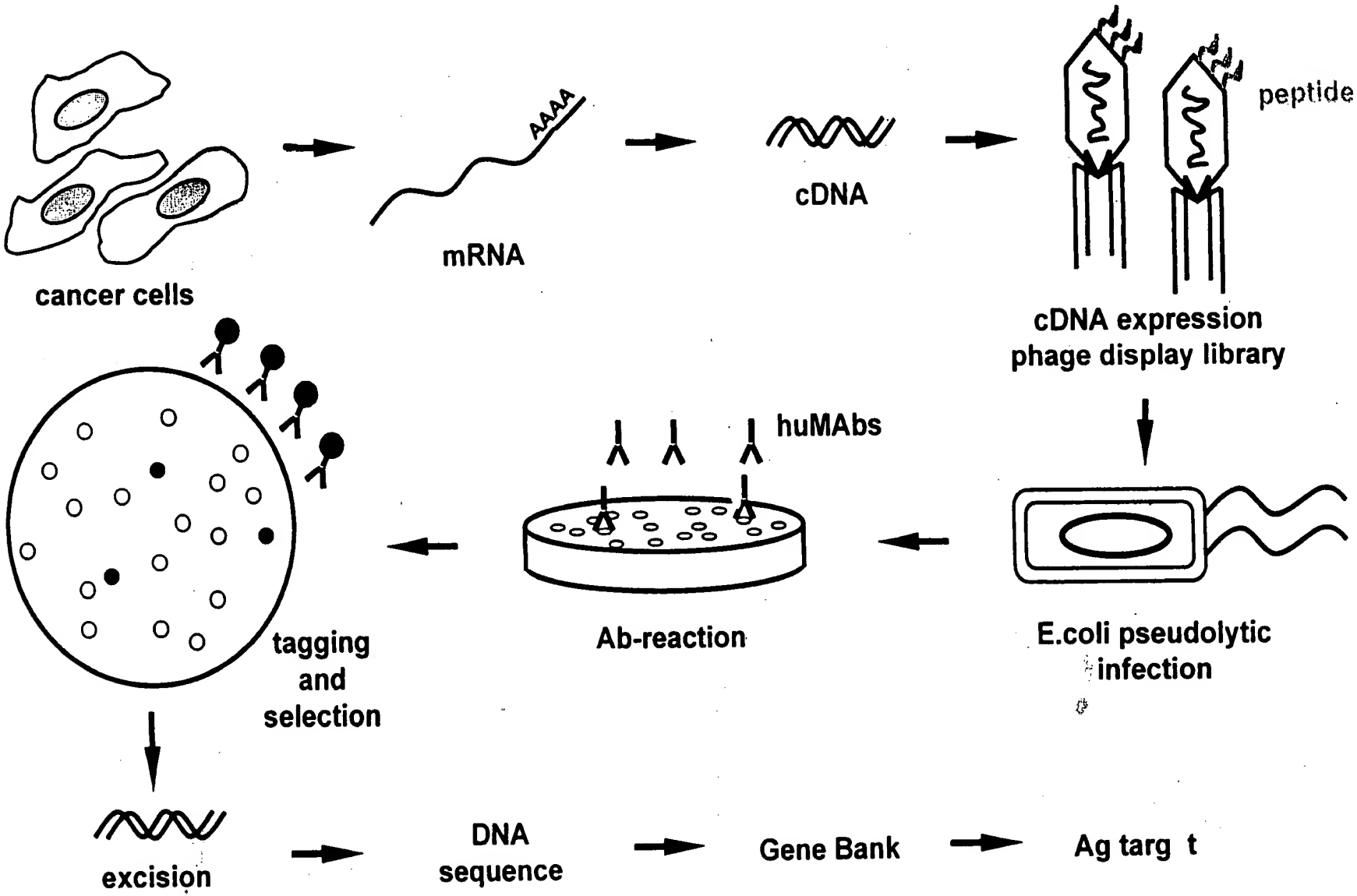


FIG. 21

DEVELOPMENT OF MOUSE anti-TIP-2 ANTIBODIES USING HUMAN anti-TIP-2 ANTIBODY BOTH AS A CAPTURE AND A TAG

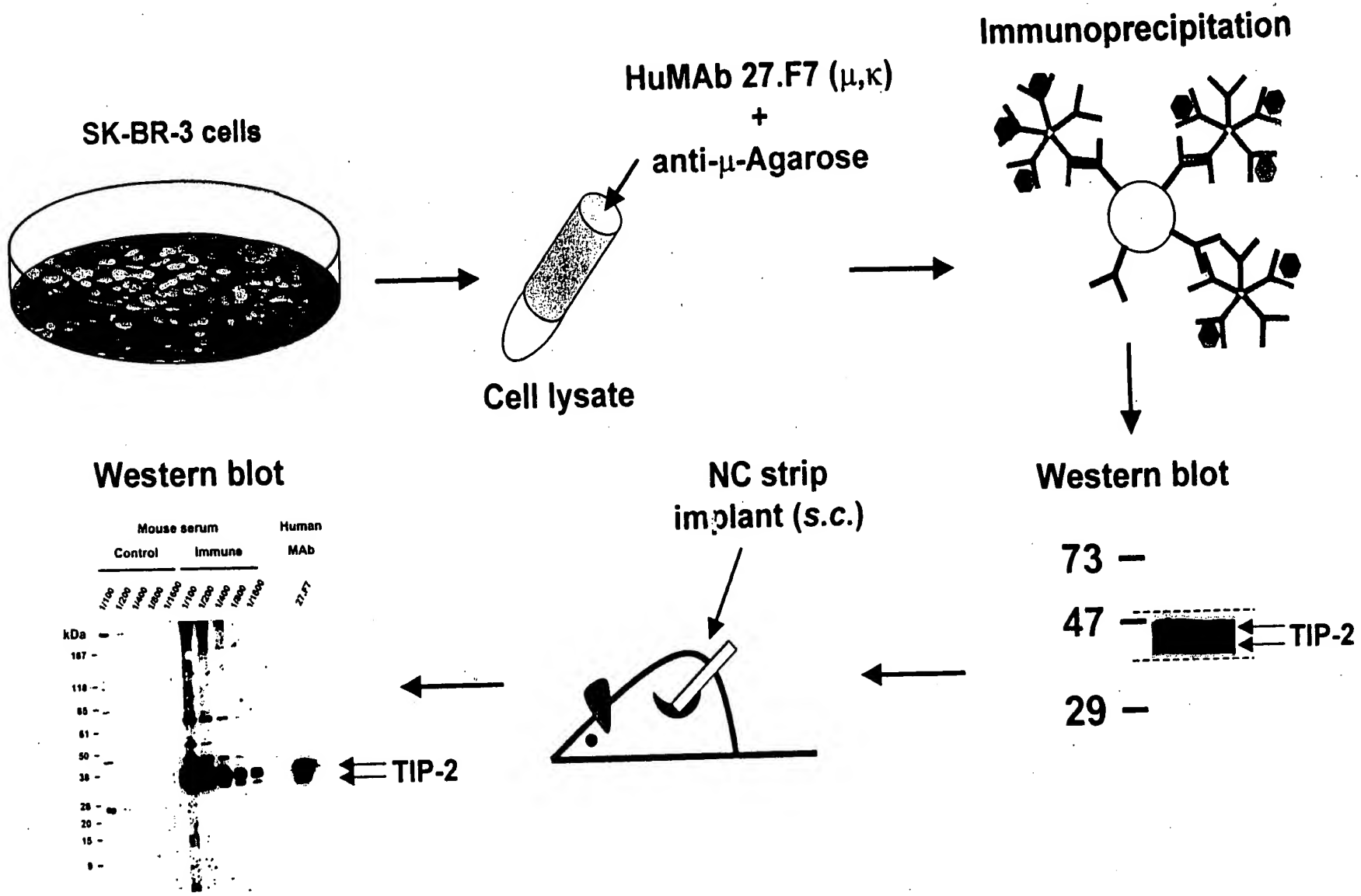
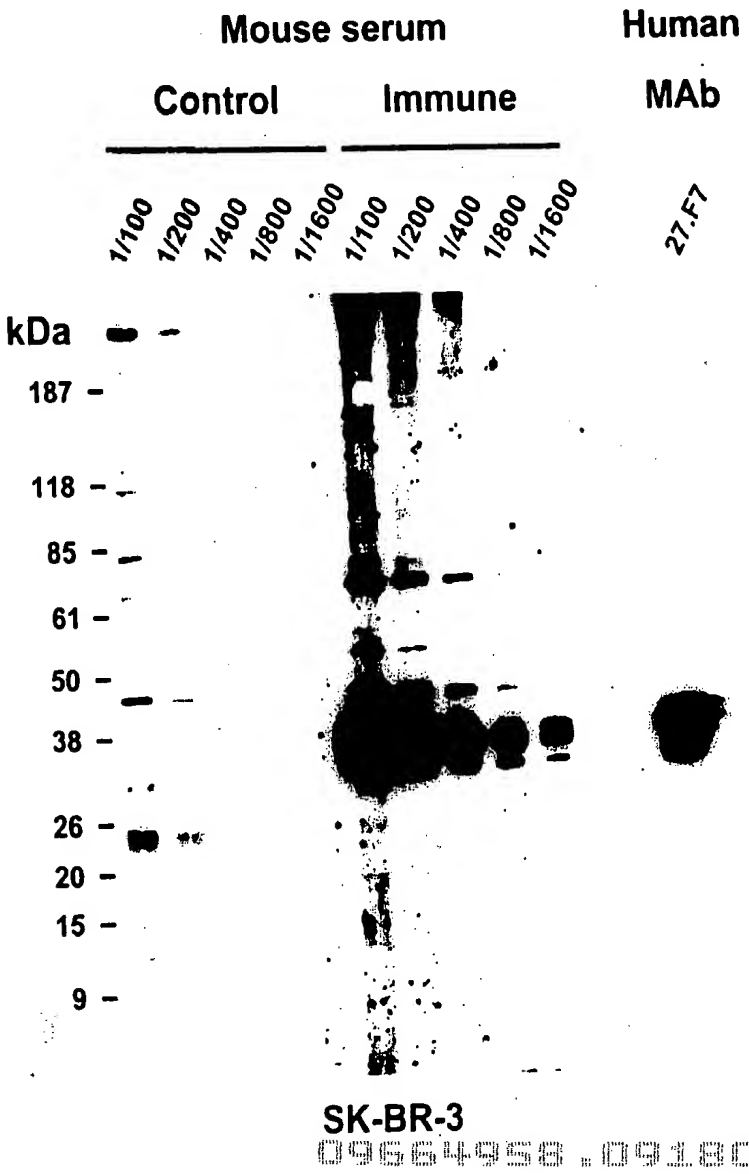


FIG. 22

SERUM IMMUNOREACTIVITY IN MOUSE IMMUNIZED WITH BREAST CANCER - ASSOCIATED ANTIGEN TIP-2



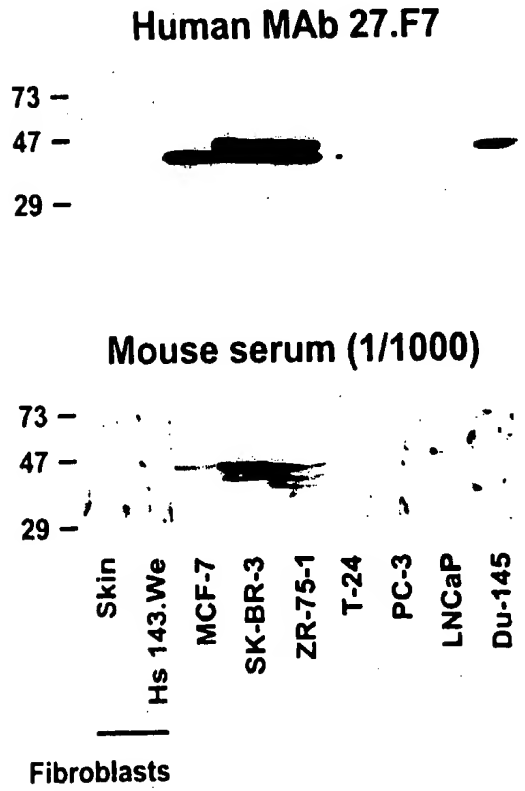


FIG. 23

Invasive Ductal Cancer Tissue Stained Indirectly with:

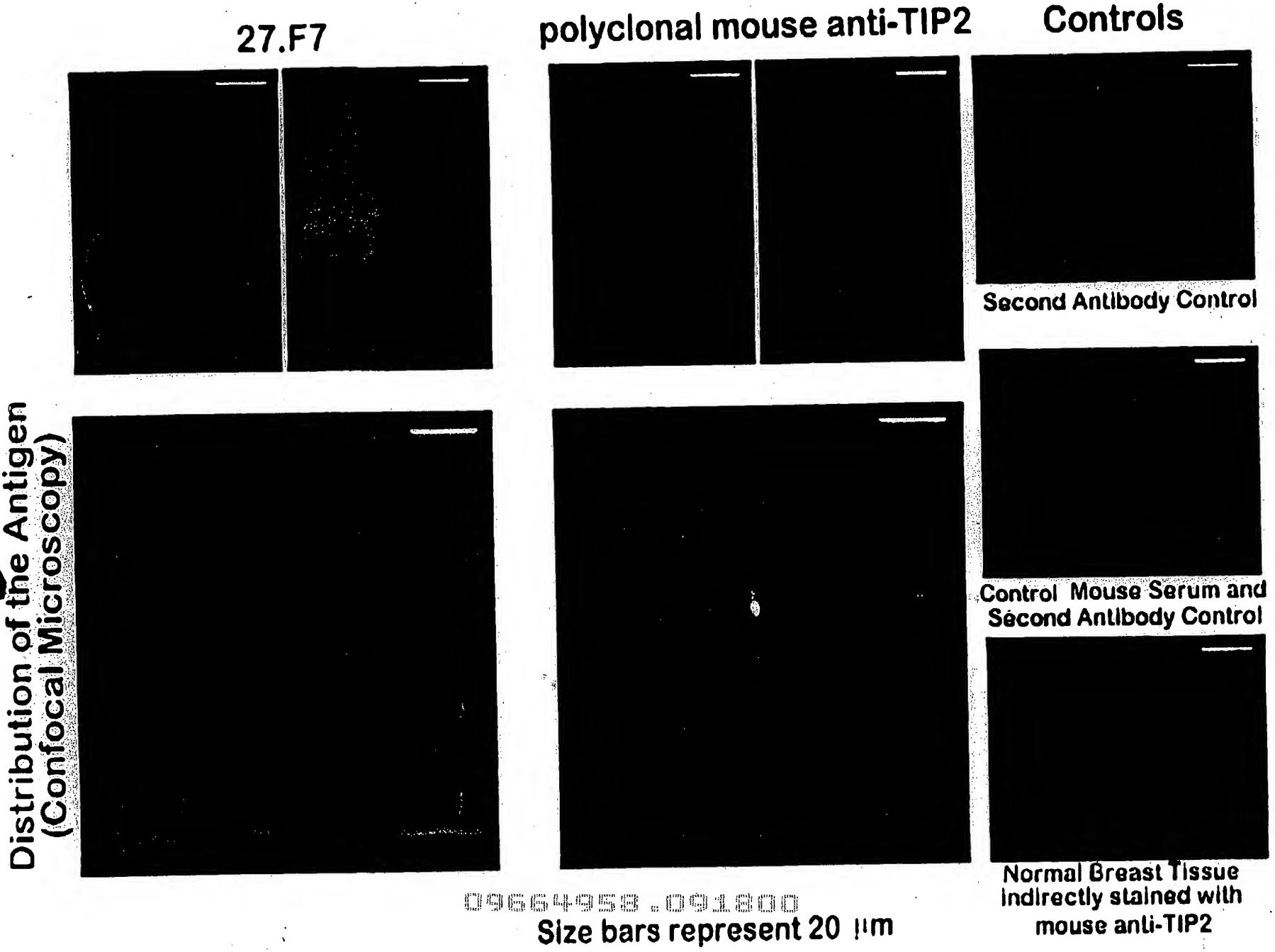


FIG. 24

Analysis for Human anti-TIP-2 Antibody 27.F7 (μ, κ) on SK-BR-3 Cells

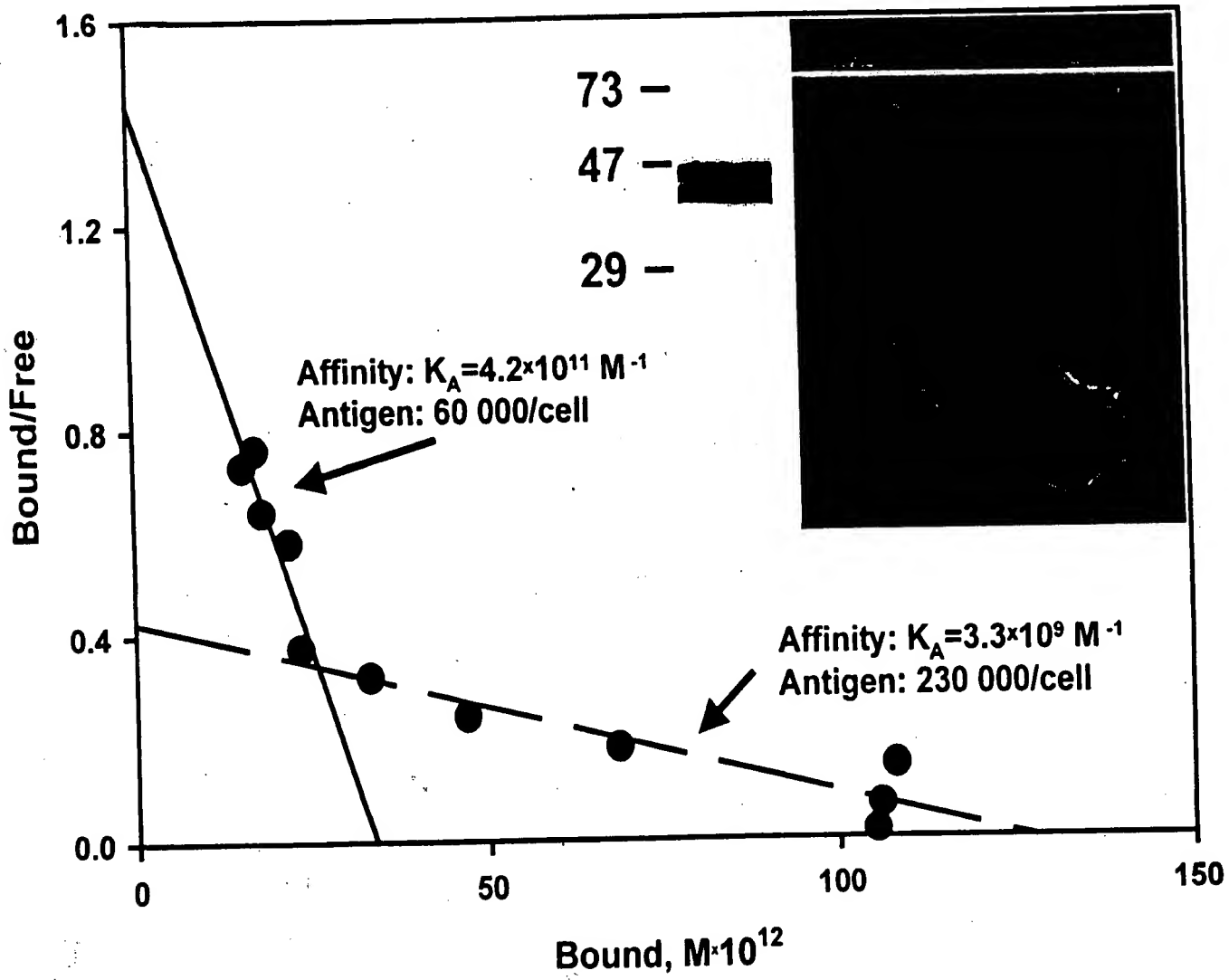


FIG. 25 Expression of TIP-2 in Normal and Cancer Breast Tissue Lysates

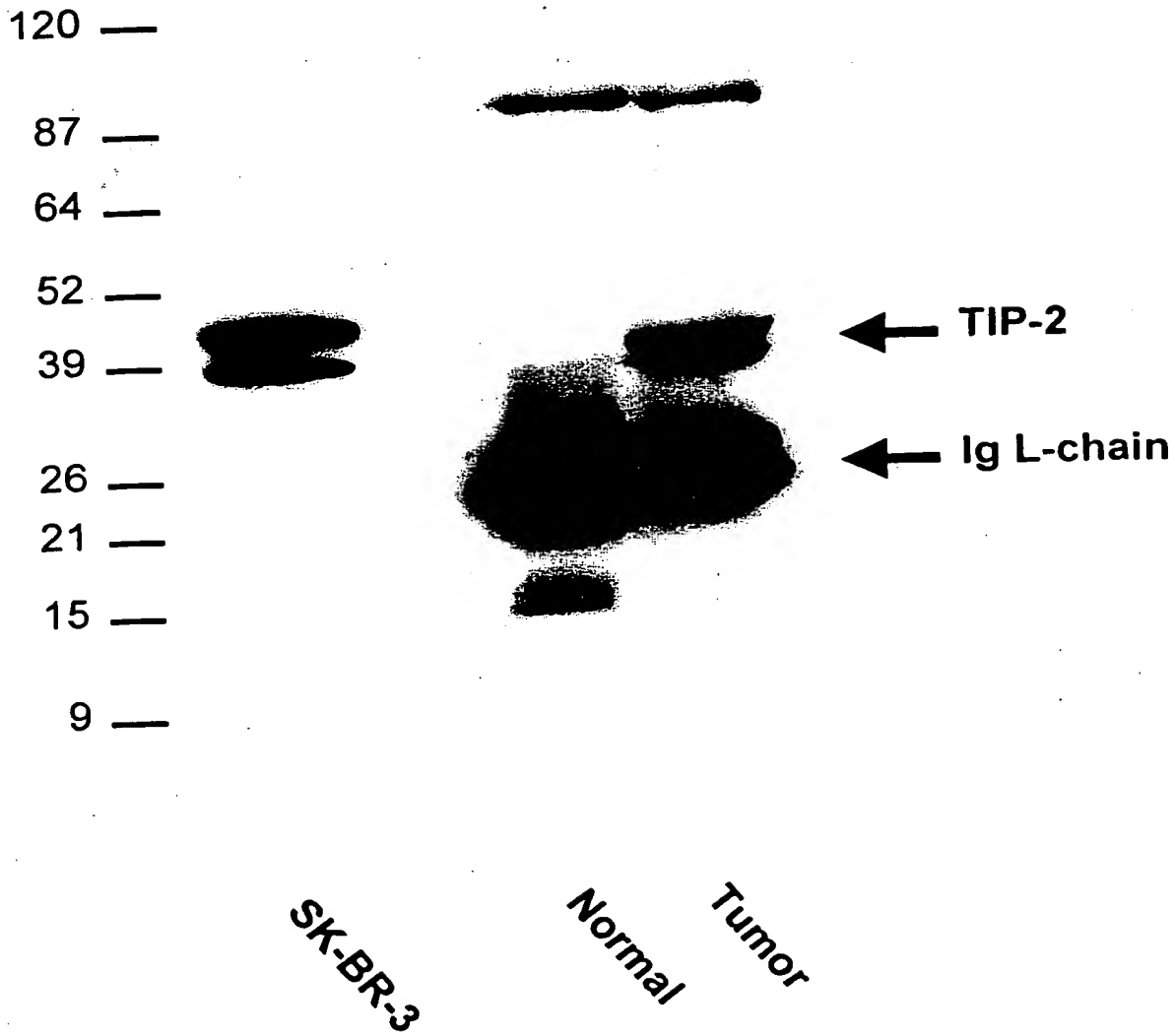
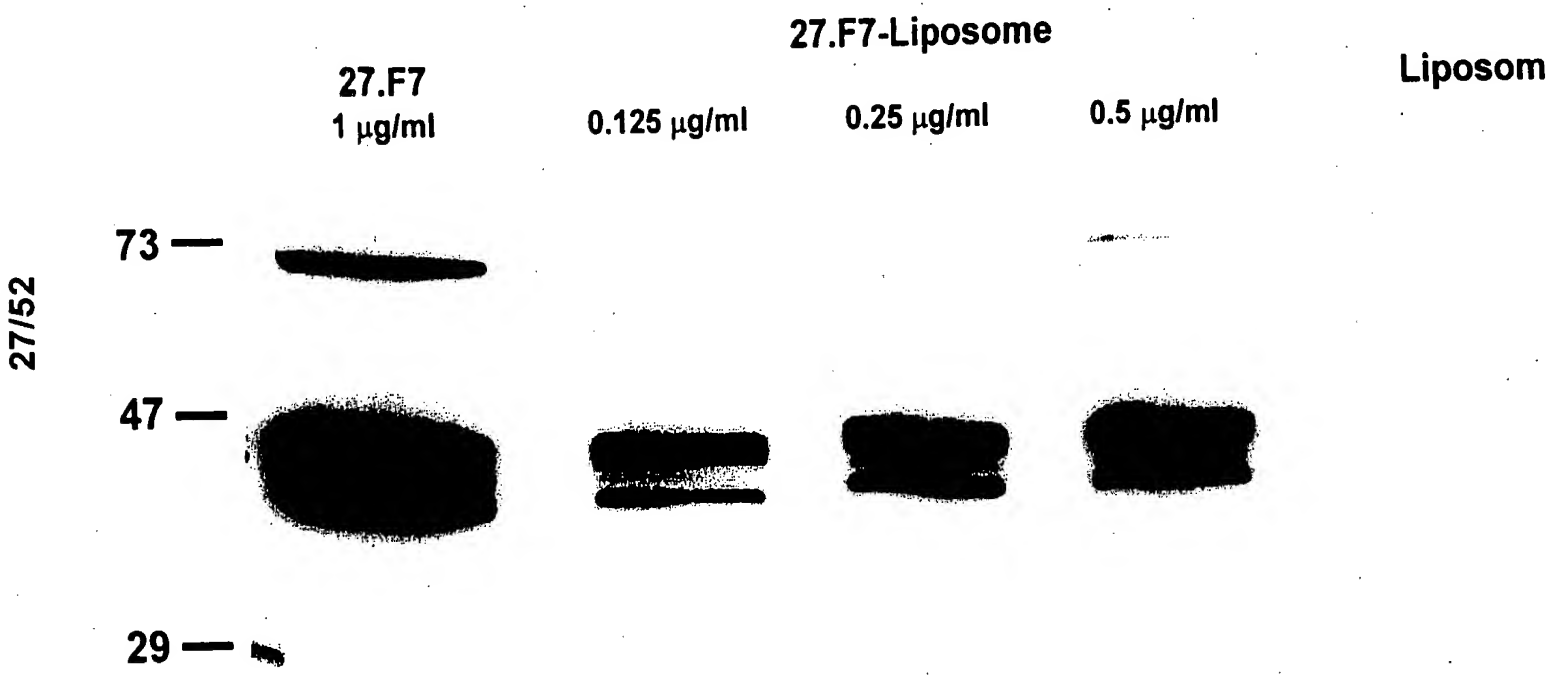


FIG. 26

Coupling of anti-TIP-2 Antibody 27.F7 (μ, κ) to Liposomes



Western blot of SK-BR-3 cell lysate

FIG. 27

Alcohol Fractionation of Human Serum Spiked with SK-BR-3 Lysates (TIP-2 Containing)

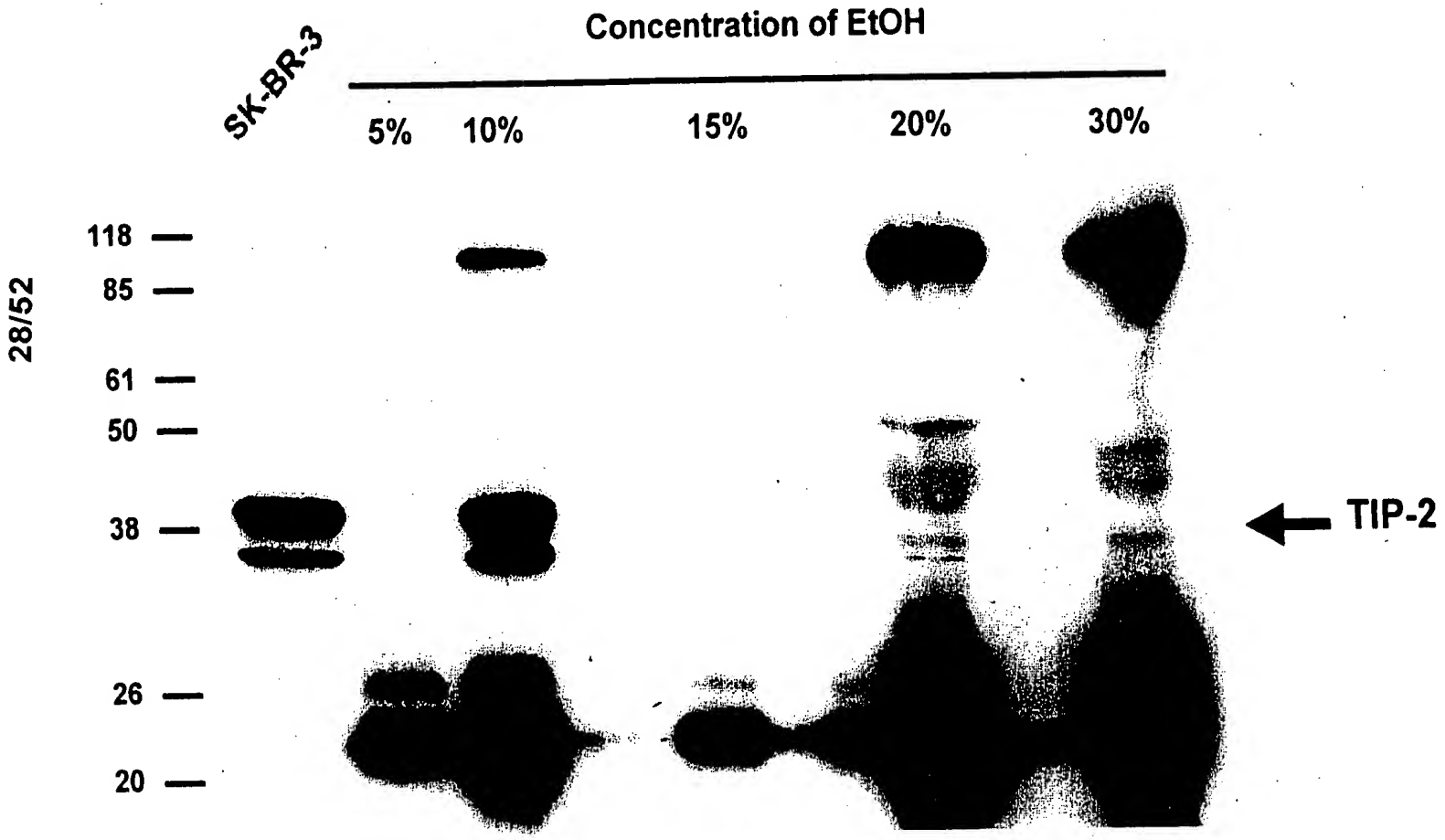


FIG. 28

Release of TIP-2 into Culture Media from SK-BR-3 Cells Treated by Taxol

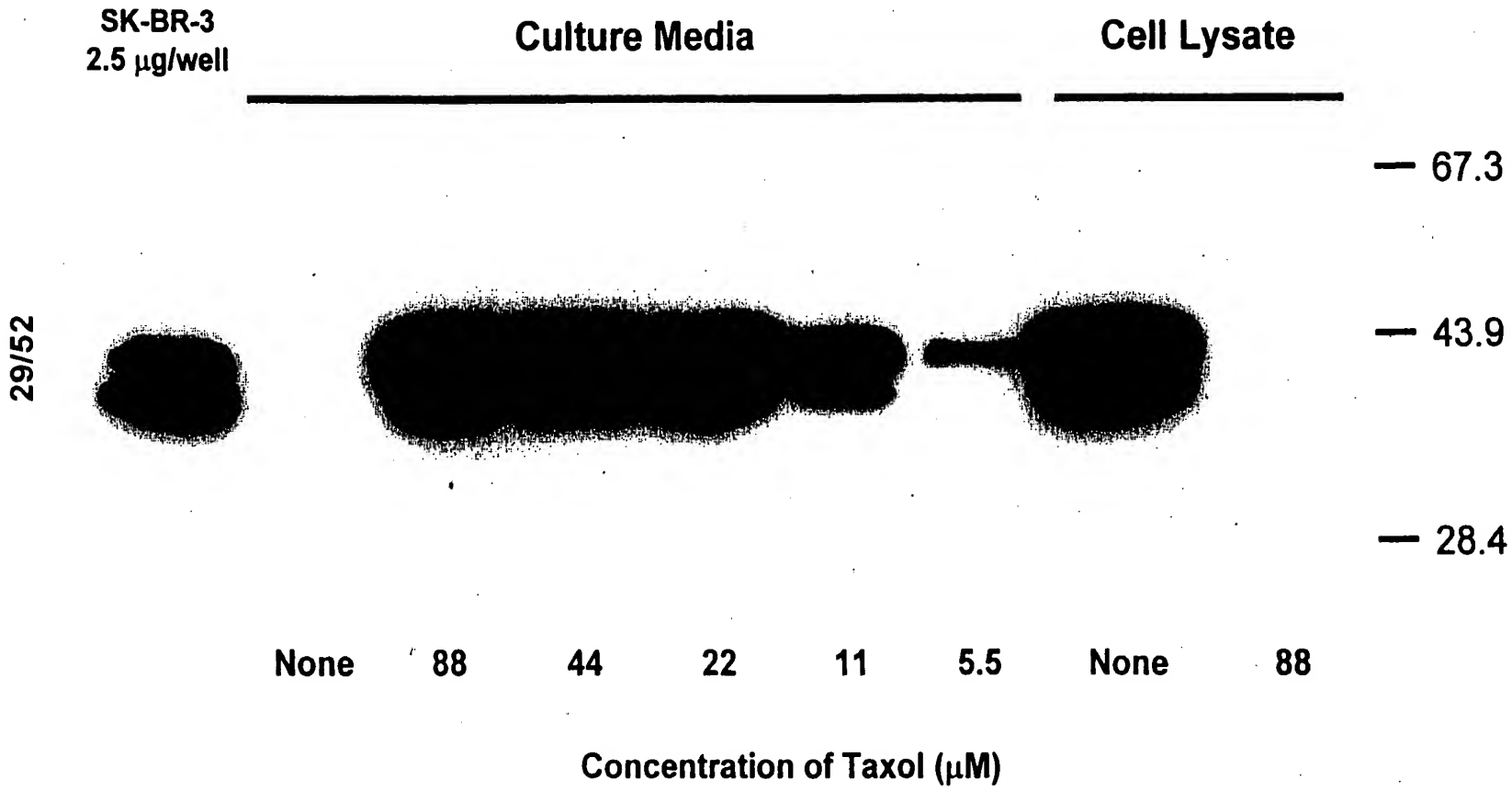


FIG. 29

Amino Acid Sequence of GLUT1CBP/GIPC Protein

```
          10         20         30         40         50         60
MPLGLGRRKK APPLVENEEA EPGRGGLGVG EPGPLGGGGS GGPQMGLPPP PPALRPRLVF

          70         80         90        100        110        120
HTQLAHGSPT GRIEGFTNVK ELYGKIAEAF RLPTAEVMFC TLNTHKVDMD KLLGGQIGLE

         130        140        150        160        170        180
DFIFAHVKGQ RKEVEVFKSE DALGLTITDN GAGYAFIKRI KEGSVIDHIH LISVGDMIEA

         190        200        210        220        230        240
INGQSLLGCR HYEVARLLKE LPRGRTFTLK LTEPRKAFDM ISQRSAGGRP GSGPQLGTGR

         250        260        270        280        290        300
GTLRLRSRGP ATVEDLPSAF EEKAIEKVDD LLESYMGIRD TELAATMVEL GKDKRNPDEL

         310        320        330
AEALDERLGD FAFPDEFVFD VWGAIGDAKV GRY
```

TIP-2 sequence is shown in italic
HLA A*0201 binding peptides (111-119 and 185-194) are shown underlined

FIG. 30

```
1    cacggggagg cggaggcagc ggcggcggcg gcggcggcgg cggcggcggc ggagcagatc
61   ttctggtgac cccacttctc gctgctcatg ccgctgggac tggggcgccg gaaaaaggcg
121  ccccctctag tggaaaatga ggaggctgag ccaggccgtg gagggctggg cgtgggggag
181  ccagggcctt tgggcggagg tgggtcgggg ggcccccaaa tgggcttgcc ccccccctccc
241  ccagccctgc ggccccgcct tgtgttccac acccagctgg cccatggcag tcccactggc
301  cgcatcgagg ggttcaccaa cgtcaaggag ctgtatggca agattgccga ggccttccgc
361  ctgccaactg ccgaggtgat gttttgcacc ctgaacaccc acaaagtgga catggacaag
421  ctcctggggg gccaaatcgg gctggaggac ttcatcttcg cccacgtgaa ggggcagcgc
481  aaggaggtgg aggtgttcaa gtcggaggat gcactcgggc tcaccatcac ggacaacggg
541  gctggctacg ccttcatcaa gcgcatcaag gagggcagcg tgatcgacca catccacctc
601  atcagcgtgg gcgacatgat cgaggccatt aacgggcaga gcctgctggg ctgccggcac
661  tacgaagtgg cccggctgct caaggaactg ccccgaggcc gtaccttcac gctgaagctc
```

FIG. 31

Protein Antigens Identified by Natural Human Monoclonal Antibodies Developed from Breast and Prostate Cancer Patients' B-Cells

Antibody	Antigen Name	Sequence	Molecular Weight (Calculated)	HLA A*0201-Specific MHC Binding Peptides	mRNA Expression in Tissues	Functions
13.42 μ,κ	Human mRNA for KIAA0338 gene, partial cds	See Fig. 32	103568 (~40kD by WB)	NLLEKDYFGL (184-193) VLFDLVCEHL (174-183) KLQHPDMLV (903-911)	Brain	Unknown
13.2C1 μ,κ	Human non-muscle alpha-actinin mRNA, complete cds - the second non muscle alpha-actinin isoform designated ACTN4 (actinin-4)	See Fig. 33	105217	KMLDAEDIV (238-246) KMTLGMIWTI (139-148) FMPSEGKMV (374-382) KLASDLLEWI (302-311) GLVTFQAFI (825-833) CQLEINFNSV (353-362)	Adipose, Adrenal gland, Aorta, Brain, Breast, CNS, Colon, Ear, Esophagus, Foreskin, Germ Cell, Heart, Kidney, Liver, Lung, Muscle, Ovary, Pancreas, Parathyroid, Placenta, Prostate, Small intestine, Stomach, Testis, Thyroid, Tonsil, Uterus, Whole embryo, breast, colon, genitourinary tract, head_neck, lung, cell line, ovary, stomach "...100kD alpha-actinin was found in the extracellular matrix of bone marrow stroma by Western blot and immunofluorescence microscopy" [Exp. Hematol. 1999, 27(2):345-52].	Actin-binding protein important in organization of cytoskeleton and in cell adhesion. "An amino-terminal fragment of alpha-actinin can promote monocyte/macrophage maturation" [Exp. Hematol. 1999, 27(2):345-52].
13.2C1 μ,κ	Homo sapiens actinin, alpha 4 (ACTN4) mRNA	See Fig. 34	102260	KMLDAEDIV (212-220) KMTLGMIWTI (113-122) FMPSEGKMV (345-353) KLASDLLEWI (273-282) GLVTFQAFI (797-805)	Adipose, Adrenal gland, Aorta, Brain, Breast, CNS, Colon, Ear, Esophagus, Foreskin, Germ Cell, Heart, Kidney, Liver, Lung, Muscle, Ovary, Pancreas, Parathyroid, Placenta, Prostate, Small intestine, Stomach, Testis, Thyroid, Tonsil, Uterus, Whole embryo, breast, colon, genitourinary tract, head_neck,	Actin-binding protein important in organization of cytoskeleton and in cell adhesion. "The cytoplasmic localization of actinin-4 was closely associated with an infiltrative histological phenotype and correlated significantly

					lung, cell line, ovary, stomach	with a poorer prognosis in 61 cases of breast cancer" [J.Cell.Biol. 1998, 140(6):1383-93]. Alpha-actinin-1 and 4 associate with PDZ domain of CLP-36 PDZ-LIM protein (also called hCLIM1 - high expression in epitelial cells) in actin stress fibers [JBC 2000, 275(15):11100-11105].
22.8D11 μ,λ	Human clathrin coat assembly protein 50 (AP50) m RNA	See Fig. 35	49662	WLAAVTKQNV (64-73) ILPFRVIPLV (284-293) SLLAQKIEV (314-322) KLNYSDHDV (410-418)	infant brain, brain, placenta, breast, ovary (tumor), fetal heart, fetal lung, multiple sclerosis lesions, pineal gland, lymph node	Component of the adaptor complexes which link clathrin to receptors in coated vesicles clathrin-associated protein co-mplexes are believed to interact with the cyto-plasmic tails of membrane proteins, leading to their selection and concen-tration. AP50 is a subunit of the plasma membrane adaptor.
27.B1 μ,κ 27.F7 μ,κ	Homo sapiens GLUT1 C-terminal binding protein (GLUT1CBP) mRNA [GIPC/TIP-2]	See Fig. 36	36047	KLLGGQIGL (111-119) SLLGCRHYEV (185-194)	Adipose, Aorta, Blood, Bone, Brain, Breast, CNS, Colon, Germ Cell, Heart, Kidney, Lung, Ovary, Pancreas, Placenta, Pooled, Stomach, Testis, Thymus, Uterus, Whole embryo, brain, breast, colon, connective tissue, lung, muscle	Binds via a PDZ domain to C terminus of GLUT1 and interact with cytoskeletal proteins
33.2H6 μ,λ	Homo sapiens gp130 associated protein GAM mRNA	See Fig. 37	21835	YLSQEHQQQV (94-103)	placenta, breast, infant brain, uterus (pregnant), B-Cell, ovary (tumor), fetal heart, fetal liver/spleen, fetal lung, T cells (Jurkat cell line)	Has a possible role in the negative regulation of proteins containing WD-40 repeats. May be required for the initiation and maintenance of the differentiated state.

33.2H6 μ,λ	Homo sapiens amino-terminal enhancer of split (AES) mRNA	See Fig. 38	21966	YLSQEHQQQV (95-104)	Adrenal gland, Aorta, Blood, Bone, Brain, Breast, CNS, Colon, Esophagus, Eye, Foreskin, Germ Cell, Head and neck, Heart, Kidney, Lung, Lymph, Muscle, Nose, Ovary, Pancreas, Parathyroid, Placenta, Pooled, Prostate, Spleen, Stomach, Synovial membrane, Testis, Thymus, Thyroid, Tonsil, Uterus, Whole embryo, brain, colon, head_neck, kidney, lung, ovary, pnet	Amino-terminal enhancer of split is similar to the Drosophila enhancer of split groucho protein. The function of AES has not been determined but it has been proposed as a candidate tumor human cancer antigen.
33.2H6 μ,λ	Antiquitin 1 (antiquitin=26g turgor protein homolog), mRNA	See Fig. 39	55357	KVMDRPGNYV (372-381) ALIEQWNPV (149-157) IITAFNFPV (162-170)	fetal heart, infant brain, placenta, NT2 neuronal precursor, liver, HeLa (cell line), ovary, liver (HepG2 cell line), ovary (tumor), multiple sclerosis lesions	Unknown (30% identity to various eukaryotic and prokaryotic aldehyde dehydrogenases). Antiquitin has homology to a previously described protein from the green garden pea, the 26g pea turgor protein. Four human antiquitin-like sequences, possibly pseudogenes, have also been identified.
39.A7 μ,λ	ARP2/3 protein complex 41 KD subunit (P41-ARC), mRNA	See Fig. 40	40935	FEQENDWWV (125-133)	HeLa (cell line), fibroblast, fetal brain, infant brain, fetal liver/spleen, monocytes (stimulated), fetal heart, uterus (pregnant), olfactory epithelium, breast	Part of a complex implicated in the control of actin polymerization in cells.belongs to a complex composed of ARP2, ARP3, P41-ARC, P34-ARC, P21-ARC, P20-ARC and P16-ARC.
50.1B3 μ,κ	H.sapiens seb4D mRNA H.sapiens seb4B mRNA	See Fig. 41a and 41b	seb4D-24617	for seb4D YLGAKPWCL (100-108) CLQTGFAIGV (107-116)	thymus, Blood, Brain, Breast, Colon, Germ Cell, Heart, Kidney, Lung, Lymph, Ovary, Parathyroid, Pooled, Prostate, Testis, Thymus, Tonsil, Uterus, brain, colon, lung, muscle, ovary,	Unknown

			seb4B-25218	for seb4B YLGAKPWCL (101-109) CLQTGFAIGV (108-117)	stomach, thymus, pooled, whole blood	
59.3G7 μ,λ	Homo sapiens lamin A/C (LMNA) mRNA	See Fig. 42	65133	KLLEGEEERL (378-387) KLVRSVTVV (542-550) RLADALQEL (240-248)	Adipose, Adrenal gland, Bone, Brain, Breast, Colon, Esophagus, Foreskin, Germ Cell, Heart, Kidney, Larynx, Liver, Lung, Lymph, Muscle, Ovary, Pancreas, Parathyroid, Placenta, Pooled, Prostate, Spleen, Stomach, Synovial membrane, Testis, Thymus, Thyroid, Uterus, Whole embryo, brain, breast, colon, denis_drash, head_neck, lung, cell line, ovary, stomach	Intermediate filament proteins

FIG. 32

Human mRNA for KIAA0338 gene, partial cds

ORIGIN

```
   1 catcagcggg cgggggtgtc gccgaacagg ctgctccgca gagcccgccg cgaccccgcg
  61 ccgccccgcc ccgcggcctg cctgccagag gagccgaggg ggccgcccct cgcccaacct
 121 gcccgacatg gggaaccccg ggcccaggcg tgctggtcac catgacaaca gagacaggcc
 181 ccgactctga ggtgaagaaa gctcaggagg aggccccgca gcagcccgag gctgctgccg
 241 ctgtgaccac ccctgtgacc cctgcaggcc acggccaccc agaggccaac tccaatgaga
 301 agcatccatc ccagcaggac acgcggcctg ctgaacagag cctagacatg gaggagaagg
 361 actacagtga ggccgatggc ctttcggaga ggaccacgcc cagcaaggcc cagaaatcgc
 421 cccagaagat tgccaagaaa tacaagagtg ccatctgccg ggtcactctg cttgatgcct
 481 cggagtatga gtgtgaggtg gagaaacatg gccggggcca ggtgctgttt gacctggtct
 541 gtgaacacct caacctccta gagaaggact acttcggcct gaccttctgt gatgctgaca
 601 gccagaagaa ctggctggac ccctccaagg agatcaagaa gcagatccgg agtagcccct
 661 ggaattttgc cttcacagtc aagttctacc cgcctgatcc tgcccagctg acagaagaca
 721 tcacaagata ctacctgtgc ctgcagctgc gggcagacat catcacgggc cggctgccat
 781 gctcctttgt cacgcatgcc ctactgggct cctacgctgt gcaggctgag ctgggtgact
 841 atgatgctga ggagcatgtg ggcaactatg tcagcgagct ccgcttcgcc cctaaccaga
 901 cccgggagct ggaggagagg atcatggagc tgcataagac atatagggg atgaccccgg
 961 gagaagcaga aatccacttc ttagagaatg ccaagaagct ttccatgtac ggagtagacc
1021 tgcaccatgc caaggactct gagggcatcg acatcatgtt aggcgtttgt gccaatggcc
1081 tgctcatcta ccgggaccgg ctgagaatca accgctttgc ctggcccaag atcctcaaga
1141 tctcctacaa gaggagtaac ttctatatca agatccggcc tggggagtat gagcaatttg
1201 agagcacaat tggctttaag ctcccaaacc accggtcagc caagagactg tggaaggtct
1261 gcatcgagca tcatacattc ttccggctgg tgtcccctga gccccaccc aagggcttcc
1321 tggtgatggg ctccaagttc cggtacagtg ggaggaccca ggcacagact cgccaggcca
1381 gcgccctcat tgaccggcct gcaccccttct ttgagcgttc ttccagcaaa cggtacacca
1441 tgtcccgcag ccttgatgga gcagagttct cccgcccagc ctcggtcagc gagaaccatg
1501 atgcagggcc tgacggtgac aagcgggatg aggatggcga gtctgggggg caacggtcag
1561 aggctgagga gggagaggtc aggactccaa ccaagatcaa ggagctaaag ccggagcagg
1621 aaaccacgcc gagacacaag caggagttct tagacaagcc agaagatgtc ttgctgaagc
1681 accaggccag catcaatgag ctcaaaagga ccctgaagga gcccaacagc aaactcatcc
```

FIG. 32 (cont.)

```
1741 accgggatcg agactgggaa cgggagcgca ggctgccctc ctcccccgcc tccccctccc
1801 ccaagggcac ccctgagaaa gccaatgaga gagcagggct gagggagggc tccgaggaga
1861 aagtcaaacc accacgtccc cgggccccag agagtgacac aggcgatgag gaccaggacc
1921 aggagaggga cacggtgttc ctgaaggaca accacctggc cattgagcgc aagtgctcca
1981 gcatcacggt cagctctacg tctagcctgg aggctgaggt ggacttcacg gtcattggtg
2041 actaccatgg cagcgccttc gaagacttct cccgcagcct gcctgagctc gaccgggaca
2101 aaagcgactc ggacactgag ggcctgctgt tctcccggga tctcaacaag ggggccccca
2161 gccaggatga tgagtctggg ggcattgagg acagcccgga tcgaggggcc tgctccaccc
2221 cggatatgcc ccagtttgag cccgtgaaaa cagaaaccat gactgtcagc agtctggcca
2281 ttagaaagaa gattgagccg gaggccgtac tgcagaccag agtctccgct atggataaca
2341 cccagcaggt tgatgggagt gcctcagtgg ggagggagtt catagcaacc actccctcca
2401 tcaccacgga gaccatatcg accaccatgg agaacagtct caagtccggg aaggggcag
2461 ctgccatgat cccaggccca cagacggtgg ccacggaaat ccgttctctt tctccgatca
2521 tcgggaaaga tgtcctcacc agcacctacg gcgccactgc ggaaaccctc tcaacctcca
2581 ccaccaccca tgtcaccaaa actgtgaaag gagggtttc tgagacaagg atcgagaagc
2641 gaatcatcat tactggggat gaagatgtcg atcaagacca ggccctggct ttggccatca
2701 aggaggccaa actgcagcat cctgatatgc tggtaaccaa agctgtcgta tacagagaaa
2761 cagacccatc cccagaggag agggacaaga agccacagga atcctgacct ctgtgaagag
2821 atcctggcat ttctggtcca acccaagcca gagaaccatt aagaaggggc cttcattctg
2881 gattctccga cgcaacactg acgtcccagc tgcgacgtac tgtcactgat gagagactgg
2941 gaagggaaaa gcatatatat atagatatat agagatatag atatatatac aggaaacacc
3001 gcatccttgc actgctgctg gggctggcag agcagttggc tgacagcaac aaccgacatc
3061 tgaacaccta catttccttt gcagacaaat tgaagaactg gtgggatttt tttcaagaaa
3121 aaaaattata taataactat aatcccttgc tcacccctt ccccccgccaa ataagaaacg
3181 caagccagac cacgatgatt gtagaagtcc ctcccgccct ggttctgcac gttacagtta
3241 gcagacgagc aattccattt gttcttctcc agcatctcta aggcccactt gaatgcaaag
3301 gaaaacactt gcacagcaaa gcaagagaag tcacagcagc aagacacgca cagtcaacca
3361 ttttccgaga aaaaaagaaa attccccact tggaaagaaa gaggaggaac actggattct
3421 tactttctgg atcttgacac tgggctgcaa aacctacctt cctctctccc gcctcccctc
3481 accctcaact ctcaatgtct tgctgtcatt ttctgtctcg gctcctcct ccccttccc
3541 ccttccccca ccccacaccc ttcaccctct gtgtcctggt ccttctgagg gccactgcag
3601 atgactctcc tttgaaatga gaaaaagaaa agaaagcaag aacagaaaac gaagccacag
3661 gaagggaagt agacattgta tgcttatggt ttctcattat gaaggtgcag cttgtaggag
3721 gtttgtacgg atgtgctttg aagttatgta tattacatat aacaggaaaa aatattaata
3781 aacagtgctg gtaagtatga agctgacatt ctaaaattat aattatctga ctgtgattga
3841 tgtatcctga ggttcctaga tctcactgaa ctggcccagc taaggagacc tggactctgg
3901 gtgtgggttg gctcacagta ggggctgacg ggttcagtgt agtaatactg tgtgtggtgt
```

FIG. 32 (cont.)

3961 ttgtaattgg ttgattggtg gggaggggtg gggggcccta atggagaggt gtgggtttgg
4021 caagaaagaa gcaacacaga tgtcgtcccc aaaatgccag ttcaagacac cttctccctg
4081 ccccсctggt agtaacagtc agggcctggt ctgtgctcag gtactgggtc ccagtctggg
4141 actctgctgc tgaagttgcc acagtagagg tccctggctt agtccttatc tccctacggg
4201 gcttgccttg gttttcagtc ttctctctct ttctctcttt tttttttttt tgccacattc
4261 tgcccttccc tgaccccatt gtaataacca actccatatc caaagggagg tggtgctctc
4321 agccattgta gaagatggtg gctttaacct gactgtctaa aaattcccag ctaagccttt
4381 tcctctactc tcttccttgt tctgaatcat ttcttcttct caggccaaag tagccatggt
4441 aaggaggctt catggggcag accctgaaag atcaaaactg catttgcaaa gccctcccct
4501 gtcccaggac aaagctgaga ctgacgggtg atgttgctca taggctccag ctctgcataa
4561 gaccttggct tggagacctc cctctcagtc aacagctgaa ctctgagctt gtgcccagaa
4621 attaccccaa gaccacagga acccttcaag aagctcccat cacaagcttg gcattgctct
4681 ctgccacacg tgggcttcct caggcttgtc tgccacaagc tacttctctg agctcagaaa
4741 gtgccccttg atgagggaaa atgtcccact gcactgcgaa tttctcagtt ccattttacc
4801 tcccagtcct ccttctaaac cagttaataa attcattcca caagtattta ctgattacct
4861 gcttgtgcca gggactattc tcaggctgaa gaaggtggga ggggagggcg gaacctgagg
4921 agccacctga gccagcttta tatttcaacc atggctggcc catctgagag catctcccca
4981 ctctcgccaa cctatcgggg catagcccag ggatgccccc aggcggccca ggttagatgc
5041 gtccctttgg cttgtcagtg atgacataca ccttagctgc ttagctggtg ctggcctgag
5101 gcagggcagg aaatcagaat agcatttgct tctctgggca aatgggaagt tcagcggggc
5161 agcagaatca gtggcattcc ccctggtgca ggccggtggg tccactccaa ctccccctga
5221 gtgtagcagc acactttcca tacaccaggt tctttctaca atcctggtgg aaaagccaca
5281 gaaccttctt cctgcccttc ttgagagttc cccctctttc tgggtcaaga gctggagtgg
5341 tggctccatc ctctctgggc cacttcggtc taggaactca tctttgcagg aaccaggagt
5401 cctgagcaca ctgaacacac ctcagaggga ggatccttgt tgtggatttt gcacctggct
5461 ttggggcagg ggtgaagtga ccaggcttag cttgtggagt ttatgggcca ccagggtttg
5521 gggaaatcac catcccgcgg atgctgtgac ctcccttcta cggagatgca ggcagtgcca
5581 cgagggagga ggggacctgc aaagctagaa tctagggcac tgtttcctcc ccatccttct
5641 ctttgtagag aatagagacg tttgtcttgt ctgtcttcaa cctacttttc cttttctctt
5701 ttttgtttct catcctctct gtgccacctc tccacccagg aggccatgta gcatagtgga
5761 aaaagtccct gagggcggtt aggagttctg ggtgaccatc ctggctcagc tcctaactca
5821 ccatgtgaca tcaggctatc cccattcccc ctcttgggcc tcagtttccc gacttgcaaa
5881 ataagcagaa agaaccagat gctctccagg gtctttttct actttgctat ctcatgggtc
5941 ttcatttttct cttattttgt tttctctgga tcttttccat ctgagggtac aggaagtacc
6001 aggacctgtt tcagtttttg aatcctgcaa gcacattcca agactggcct gaaactgcat
6061 gagcaacatc actcgaaata attttttttt tcaaaagcac cttaacaacc aattgcgatg
6121 ctgtcctgtt ccttttttact cacacccttc tctc[illegible]ttct cgtccccatg ctccccccacc

FIG. 32 (cont.)

```
6181 tcagtgctcc gtgctgtatg cgtgtgctct ctgttcttgt atactcaata taagtgaaat
6241 aaatgtgttt gatgctgaac cat
```

Translation:

```
SAGGGVAEQAAPQSPPRPRAAPPRGLPARGAEGAAPRPTCPTWGTPGPGVLVTMTTET
GPDSEVKKAQEEAPQQPEAAAAVTTPVTPAGHGHPEANSNEKHPSQQDTRPAEQSLDM
EEKDYSEADGLSERTTPSKAQKSPQKIAKKYKSAICRVTLLDASEYECEVEKHGRGQV
LFDLVCEHLNLLEKDYFGLTFCDADSQKNWLDPSKEIKKQIRSSPWNFAFTVKFYPPD
PAQLTEDITRYYLCLQLRADIITGRLPCSFVTHALLGSYAVQAELGDYDAEEHVGNYV
SELRFAPNQTRELEERIMELHKTYRGMTPGEAEIHFLENAKKLSMYGVDLHHAKDSEG
IDIMLGVCANGLLIYRDRLRINRFAWPKILKISYKRSNFYIKIRPGEYEQFESTIGFK
LPNHRSAKRLWKVCIEHHTFFRLVSPEPPPKGFLVMGSKFRYSGRTQAQTRQASALID
RPAPFFERSSSKRYTMSRSLDGAEFSRPASVSENHDAGPDGDKRDEDGESGGQRSEAE
EGEVRTPTKIKELKPEQETTPRHKQEFLDKPEDVLLKHQASINELKRTLKEPNSKLIH
RDRDWERERRLPSSPASPSPKGTPEKANERAGLREGSEEKVKPPRPRAPESDTGDEDQ
DQERDTVFLKDNHLAIERKCSSITVSSTSSLEAEVDFTVIGDYHGSAFEDFSRSLPEL
DRDKSDSDTEGLLFSRDLNKGAPSQDDESGGIEDSPDRGACSTPDMPQFEPVKTETMT
VSSLAIRKKIEPEAVLQTRVSAMDNTQQVDGSASVGREFIATTPSITTETISTTMENS
LKSGKGAAAMIPGPQTVATEIRSLSPIIGKDVLTSTYGATAETLSTSTTTHVTKTVKG
GFSETRIEKRIIITGDEDVDQDQALALAIKEAKLQHPDMLVTKAVVYRETDPSPEERD
KKPQES
```

FIG. 33

Human non-muscle alpha-actinin mRNA, complete cds -
the second non-muscle alpha-actinin isoform designated ACTN4 (actinin-4)

ORIGIN

```
   1 gcgcgccggc ggctcgggca gaggggcggg agctgaggcg ggagcggaca ggctggtggg
  61 cgagcgagag gcgcggaatg gtggactacc acgcggcgaa ccagtcgtac cagtacggcc
 121 ccagcagcgc ggcaatggct tggcggcggg ggagcatggg cgactacatg gcccaggagg
 181 acgactggga ccgggacctg ctgctggacc cggcctggga gaagcagcag cgcaagacct
 241 tcacggcatg gagcaactcc cacctgcgga aggcaggcac acagatcgag aacattgatg
 301 aggacttccg agacgggctc aagctcatgc tgctcctgga ggtcatatca ggggagcggt
 361 tacctaagcc ggagcggggg aagatgagag tgcacaaaat caacaatgtg aacaaagcgc
 421 tggactttat tgccagcaaa gggatcaagc tggacttcca tcgggcagaa gagattgtgg
 481 acggcaacgc aaagatgacc ctgggaatga tctggaccat catccttagg ttcgccatcc
 541 aggacatctc cgtggaagag acctcggcca aggaagggct ccttctctgg tgccagagaa
 601 agacagcccc atataagaac gtcaatgtgc agaacttcca catcagctgg aaggatggtc
 661 ttgccttcaa tgccctgatc caccggcaca gaccagagct gattgagtat gacaagctga
 721 ggaaggacga ccctgtcacc aacctgaaca atgccttcga agtggctgag aaatacctcg
 781 acatccccaa gatgctggat gcagaggaca tcgtgaacac ggcccggccc gacgagaagg
 841 ccataatgac ctatgtgtcc agcttctacc atgccttttc aggagcgcag aaggctgaaa
 901 ctgaaactgc cgccaaccgg atctgtaagg tgctggctgt caaccaagag aactgcagca
 961 cctcgatgga ggactacgag aagctggcca gcgacctcct ggagtggatc cggcgcacca
1021 tcccctggct ggaggaccgt gtgccccaaa agactatcca ggagatgcag cagaagctgg
1081 aggacttccg cgactaccgg cgtgtgcaca agccgcccaa ggtgcaggag aagtgccagc
1141 tggagatcaa cttcaacagc gtgcagacca agctgcgcct cagcaaccgg cccgccttca
1201 tgccctccga gggcaagatg gtctcggaca tcaacaatgg ctggcagcac ttggagcagg
1261 ctgagaaggg ctacgaggag tggctgctga atgagattcg caggctggag cggctcgacc
1321 acctggcaga gaagttccgg cagaaagcct ccatccacga ggcctggact gacgggaagg
1381 aagccatgct gaagcaccgg gactacgaga cggccacact atcggacatc aaagccctca
1441 ttcgcaagca cgaggccttc gagagcgacc tggctgcgca ccaggaccgc gtggagcaga
1501 tcgccgcctc cgcccaggag ctcaacgagc tggattacta cgactcccac aatgtcaaca
1561 cccggtgcca gaagatctgt gaccagtggg acgccctcgg ctctctgaca catagtcgca
1621 gggaagccct ggagaaaaca gagaagcagc tggaggccat catcgaccag ctgcacctgg
1681 aatacgccaa gcccgcggcc cccttcaaca actggatgga gagcgccatg gaggacctcc
1741 aggacatgtt catcgtccat accatcgagg agattgaggg cctgatctca gcccatgacc
1801 agttcaagtc caccctgccg gacgccgata gggagcgcga ggccatcctg catccacaag
1861 gaggccagag gatcgctgag agcaaccaca tcaagctgtc gggcagcaac ccctacacca
1921 ccgtcacccc gcaaatcatc aactccaagt gggagaaggt gcagcagctg gtgccaaaac
1981 gggaccatgc cctcctggag gagcagagca agcagcagca gtccaacgag cacctgcgcc
2041 gccagttcgc cagccaggcc aatgttgtgg ggccctggat ccagaccaag atggaggaga
2101 tcgcgatctc cattgagatg aacgggaccc tggaggacca gctgagccac ctgaagcagt
2161 atgaacgcag catcgtggac tacaagccca acctggacct gctggagcag cagcaccagc
2221 tcatccagga ggccctcatc ttcgacaaca agcacaccaa ctataccatg gagcacatcc
2281 gcgtgggctg ggagcagctg ctcaccacca ttgcccgcac catcaacgag gtggagaacc
2341 agatccttac ccgcgacgcc aagggcatca gccaggagca gatgcaggag ttccgggcgt
2401 ccttcaacca cttcgacaag gatcatggcg gggcgctggg gcgaggagtt caaggcctgc
2461 ctcatcagcc tgggctacga cgtggagaac gaccggcagg tgaggccgag ttcaaccgca
2521 tcatgagcct ggtcgacccc aaccatagcg gccttgttac cttccaagcc ttcatcgact
2581 tcatgtcgcg ggagaccacc gacaccgaca cggctgacca ggtaatcact tccttcaagg
```

FIG. 33 (cont.)

```
2641 tcctagcagg ggacaagaac ttcatcacag ctgaggagct gcggagagag ctgccccccg
2701 accaggccga gtactgcatc gcccgcatgg cgccatacca gggccctgac ggcgtgcgcg
2761 gtgccctcga ctacaagtcc ttctccacgg ccttgtatgg cgagagcgac ctgtgaggcc
2821 ccagagacct gacccaacac ccccgacgcc tccaggagcc tggcagcccc acagtcccat
2881 tcctccactc tgtatctatg caaagcactc tctctgcagt ctccggggtg ggtgggtggg
2941 cagggagggg ctggggcagg ctctctcctc tctctctttg tgggttggcc aggaggttcc
3001 cccgaccagg ttggggagac ttggggccag cgcttctggt ctggtaaata tgtatgatgt
3061 gttgtgcttt tttaaccaag gaggggccag tggattccca cagcacaacc ggtcccttcc
3121 atgccctggg atgcctcacc acacccaggt ctcttccttt gctctgaggt cccttcaagg
3181 cctccccaat ccaggccaaa gccccatgtg ccttgtccag ggaactgcct gggccatgcg
3241 aggggccagc agagggcgcc accacctgac ggctgggacc cacccagccc ctctcccctc
3301 tctgctccag actcacttgc cattgccagg agatggcccc aacaagcacc ccgcttttgc
3361 agcagaggag ctgagttggc agaccgggcc cccctgaacc gcaccccatc ccaccagccc
3421 cggccttgct ttgtctggcc tcacgtgtct cagattttct aagaaccaaa aaaa
```

Translation:

```
MVDYHAANQSYQYGPSSAAMAWRRGSMGDYMAQEDDWDRDLLLDPAWEKQQRKTFTAW
SNSHLRKAGTQIENIDEDFRDGLKLMLLLEVISGERLPKPERGKMRVHKINNVNKALD
FIASKGIKLDFHRAEEIVDGNAKMTLGMIWTIILRFAIQDISVEETSAKEGLLLWCQR
KTAPYKNVNVQNFHISWKDGLAFNALIHRHRPELIEYDKLRKDDPVTNLNNAFEVAEK
YLDIPKMLDAEDIVNTARPDEKAIMTYVSSFYHAFSGAQKAETETAANRICKVLAVNQ
ENCSTSMEDYEKLASDLLEWIRRTIPWLEDRVPQKTIQEMQQKLEDFRDYRRVHKPPK
VQEKCQLEINFNSVQTKLRLSNRPAFMPSEGKMVSDINNGWQHLEQAEKGYEEWLLNE
IRRLERLDHLAEKFRQKASIHEAWTDGKEAMLKHRDYETATLSDIKALIRKHEAFESD
LAAHQDRVEQIAASAQELNELDYYDSHNVNTRCQKICDQWDALGSLTHSRREALEKTE
KQLEAIIDQLHLEYAKPAAPFNNWMESAMEDLQDMFIVHTIEEIEGLISAHDQFKSTL
PDADRENEAILHPQGGQRIAESNHIKLSGSNPYTTVTPQIINSKWEKVQQLVPKRDHA
LLEEQSKQQQSNEHLRRQFASQANVVGPWIQTKMEEIAISIEMNGTLEDQLSHLKQYE
RSIVDYKPNLDLLEQQHQLIQEALIFDNKHTNYTMEHIRVGWEQLLTTIARTINEVEN
QILTRDAKGISQEQMQEFRASFNHFDKDHGGALGRGVQGLPHQPGLRRGERPAGEAEF
NRIMSLVDPNHSGLVTFQAFIDFMSRETTDTDTADQVITSFKVLAGDKNFITAEELRR
ELPPDQAEYCIARMAPYQGPDGVRGALDYKSFSTALYGESDL
```

FIG. 34

Homo sapiens actinin, alpha 4 (ACTN4) mRNA

```
ORIGIN
        1 cgcggccgcg tcgacctacc acgcggcgaa ccagtcgtac cagtacggcc ccagcagcgc
       61 gggcaatggc gctggcggcg ggggcagcat gggcgactac atggcccagg aggacgactg
      121 ggaccgggac ctgctgctgg acccggcctg ggagaagcag cagcgcaaga ccttcacggc
      181 atggtgcaac tcccacctgc ggaaggcagg cacacagatc gagaacattg atgaggactt
      241 ccgagacggg ctcaagctca tgctgctcct ggaggtcata tcaggggagc ggttacctaa
      301 gccggagcgg gggaagatga gagtgcacaa aatcaacaat gtgaacaaag cgctggactt
      361 tattgccagc aaaggcgtca agctggtctc catcggggca gaagagattg tggacggcaa
      421 cgcaaagatg accctgggaa tgatctggac catcatcctt aggttcgcca tccaggacat
      481 ctccgtggaa gagacctcgg ccaaggaagg gctccttctc tggtgccaga gaaagacagc
      541 cccgtataag aacgtcaatg tgcagaactt ccacatcagc tggaaggatg gtcttgcctt
      601 caatgccctg atccaccggc acagaccaga gctgattgag tatgacaagc tgaggaagga
      661 cgaccctgtc accaacctga acaatgcctt cgaagtggct gagaaatacc tcgacatccc
      721 caagatgctg gatgcagagg acatcgtgaa cacggcccgg cccgacgaga aggccataat
      781 gacctatgtg tccagcttct accatgcctt ttcaggagcg cagaaggctg aaactgccgc
      841 caaccggatc tgtaaggtgc tggctgtcaa ccaagagaac gagcacctga tggaggacta
      901 cgagaagctg gccagcgacc tcctggagtg gatccggcgc accatcccct ggctggagga
      961 ccgtgtgccc caaaagacta tccaggagat gcagcagaag ctggaggact tccgcgacta
     1021 ccggcgtgtg cacaagccgc ccaaggtgca ggagaagtgc cagctggaga tcaacttcaa
     1081 cacgctgcag accaagctgc gcctcagcaa ccggcccgcc ttcatgccct ccgagggcaa
     1141 gatggtctcg gacatcaaca atggctggca gcacttggag caggctgaga agggctacga
     1201 ggagtggctg ctgaatgaga tccgcaggct ggagcggctc gaccacctgg cagagaagtt
     1261 ccggcagaag gcctccatcc acgaggcctg gactgacggg aaggaagcca tgctgaagca
     1321 ccgggactac gagacggcca cactatcgga catcaaagcc ctcattcgca agcacgaggc
     1381 cttcgagagc gacctggctg cgcaccagga ccgcgtggag cagatcgccg ccattgccca
     1441 ggagctcaac gagctggatt actacgactc ccacaatgtc aacacccggt gccagaagat
     1501 ctgtgaccag tgggacgccc tcggctctct gacacatagt cgcagggaag ccctggagaa
     1561 aacagagaag cagctggagg ccatcgacca gctgcacctg gaatacgcca agcgcgcggc
     1621 cccettcaac aactggatgg agagcgccat ggaggacctc caggacatgt tcatcgtcca
     1681 taccatcgag gagattgagg gcctgatctc agcccatgac cagttcaagt ccaccctgcc
     1741 ggacgccgat agggagcgcg aggccatcct ggccatccac aaggaggccc agaggatcgc
     1801 tgagagcaac cacatcaagc tgtcgggcag caacccctac accaccgtca ccccgcaaat
```

FIG. 34 (cont.)

```
1861 catcaactcc aagtgggaga aggtgcagca gctggtgcca aaacgggacc atgccctcct
1921 ggaggagcag agcaagcagc agtccaacga gcacctgcgc cgccagttcg ccagccaggc
1981 caatgttgtg gggccctgga tccagaccaa gatggaggag atcgggcgca tctccattga
2041 gatgaacggg accctggagg accagctgag ccacctgaag cagtatgaac gcagcatcgt
2101 ggactacaag cccaacctgg acctgctgga gcagcagcac cagctcatcc aggaggccct
2161 catcttcgac aacaagcaca ccaactatac catggagcac atccgcgtgg gctgggagca
2221 gctgctcacc accattgccc gcaccatcaa cgaggtggag aaccagatcc tcacccgcga
2281 cgccaagggc atcagccagg agcagatgca ggagttccgg gcgtccttca accacttcga
2341 caaggatcat ggcggggcgc tggggcccga ggagttcaag gcctgcctca tcagcctggg
2401 ctacgacgtg gagaacgacc ggcagggtga ggccgagttc aaccgcatca tgagcctggt
2461 cgaccccaac catagcggcc ttgtgacctt ccaagccttc atcgacttca tgtcgcggga
2521 gaccaccgac acggacacgg ctgaccaggt catcgcttcc ttcaaggtct tagcagggga
2581 caagaacttc atcacagctg aggagctgcg gagagagctg ccccccgacc aggccgagta
2641 ctgcatcgcc cgcatggcgc ataccaggg ccctgacgcc gtgcccggtg ccctcgacta
2701 caagtccttc tccacggcct tgtatggcga gagcgacctg tgaggcccca gagacctgac
2761 ccaacacccc cgacggcctc caggaggggc ctgggcagcc ccacagtccc attcctccac
2821 tctgtatcta tgcaaagcac tctctgcagt cctccggggt gggtgggtgg gca
```

Translation:

```
MGDYMAQEDDWDRDLLLDPAWEKQQRKTFTAWCNSHLRKAGTQIENIDEDFRDGLKLMLL
LEVISGERLPKPERGKMRVHKINNVNKALDFIASKGVKLVSIGAEEIVDGNAKMTLGMIW
TIILRFAIQDISVEETSAKEGLLLWCQRKTAPYKNVNVQNFHISWKDGLAFNALIHRHRP
ELIEYDKLRKDDPVTNLNNAFEVAEKYLDIPKMLDAEDIVNTARPDEKAIMTYVSSFYHA
FSGAQKAETAANRICKVLAVNQENEHLMEDYEKLASDLLEWIRRTIPWLEDRVPQKTIQE
MQQKLEDFRDYRRVHKPPKVQEKCQLEINFNTLQTKLRLSNRPAFMPSEGKMVSDINNGW
QHLEQAEKGYEEWLLNEIRRLERLDHLAEKFRQKASIHEAWTDGKEAMLKHRDYETATLS
DIKALIRKHEAFESDLAAHQDRVEQIAAIAQELNELDYYDSHNVNTRCQKICDQWDALGS
LTHSRREALEKTEKQLEAIDQLHLEYAKRAAPFNNWMESAMEDLQDMFIVHTIEEIEGLI
SAHDQFKSTLPDADREREAILAIHKEAQRIAESNHIKLSGSNPYTTVTPQIINSKWEKVQ
QLVPKRDHALLEEQSKQQSNEHLRRQFASQANVVGPWIQTKMEEIGRISIEMNGTLEDQL
SHLKQYERSIVDYKPNLDLLEQQHQLIQEALIFDNKHTNYTMEHIRVGWEQLLTTIARTI
NEVENQILTRDAKGISQEQMQEFRASFNHFDKDHGGALGPEEFKACLISLGYDVENDRQG
EAEFNRIMSLVDPNHSGLVTFQAFIDFMSRETTDTDTADQVIASFKVLAGDKNFITAEEL
RRELPPDQAEYCIARMAPYQGPDAVPGALDYKSFSTALYGESDL
```

FIG. 35

CLATHRIN COAT ASSEMBLY PROTEIN AP50

ORIGIN

```
   1 caggtctgtt ctcagagcga tgggccgcag agactgatct gccgccatga ttggaggctt
  61 attcatctat aatcacaagg gggaggtgct catctcccga gtctaccgag atgacatcgg
 121 gaggaacgca gtggatgcct ttcgggtcaa tgttatccat gcccggcagc aggtgcgcag
 181 ccccgtcacc aacattgctc gcaccagctt cttccacgtt aagcggtcca acatttggct
 241 ggcagcagtc accaagcaga atgtcaacgc tgccatggtc ttcgaattcc tctataagat
 301 gtgtgacgtg atggccgctt actttggcaa gatcagcgag gaaaacatca agaacaattt
 361 tttgctcata tatgagctgc tggatgagat tctagacttt ggctacccac agaattccga
 421 gacaggcgcg ctgaaaacct tcatcacgca gcagggcatc aagagtcagc atcagacaaa
 481 agaagagcag tcacagatca ccagccaggt aactgggcag attggctggc ggcgagaggg
 541 catcaagtat cgtcggaatg agctcttcct ggatgtgctg gagagtgtga acctgctcat
 601 gtccccacaa gggcaggtgc tgagtgccca tgtgtcgggc cgggtggtga tgaagagcta
 661 cctgagtggc atgcctgaat gcaagtttgg gatgaatgac aagattgtta ttgaaaagca
 721 gggcaaaggc acagctgatg aaacaagcaa gagcgggaag caatcaattg ccattgatga
 781 ctgcaccttc caccagtgtg tgcgactcag caagtttgac tctgaacgca gcatcagctt
 841 tatcccgcca gatggagagt ttgagcttat gaggtatcgc acaaccaagg acatcatcct
 901 tcccttccgg gtgatcccgc tagtgcgaga agtgggacgc accaaactgg aggtcaaggt
 961 ggtcatcaag tccaacttta aaccctcact gctggctcag aagattgagg tgaggatccc
1021 aaccccactg aacacaagcg gggtgcaggt gatctgcatg aaggggaagg ccaagtacaa
1081 ggccagcgag aatgccatcg tgtggaagat caagcgcatg gcaggcatga aggaatcgca
1141 gatcagcgca gagattgagc ttctgcctac caacgacaag aagaaatggg ctcgaccccc
1201 catttccatg aactttgagg tgccattcgc gccctctggc ctcaaggtgc gctacttgaa
1261 ggtgtttgaa ccgaagctga actacagcga ccatgatgtc atcaaatggg tgcgctacat
1321 tggccgcagt ggcatttatg aaactcgctg ctagctgcca ctaggcagct agcccacctc
1381 cccagccacc ctcctccaca ggtccaggtg ccgctccctc ccccaccaca catcagtgtc
1441 tcctccctcc tgctttgctg ccttcccttt gcaccagccc gagtctaggt ctgggccaag
1501 cacattacaa gtgggaccgg tggagcagcc cctgggctcc ctgggcaggg gagttctgag
1561 gctcctgctc tcccatccac ctgtctgtcc tggcctaatg ccaggctctg agttctgtga
1621 ccaaagccag gtgggttccc tttccttccc acccctgtgg ccacagctct ggagtgggag
1681 ggttggttgc ccctcacctc agagctcccc caaaggccag taatggatcc ccggcctcag
1741 tccctactct gctttgggat agtgtgagct tcattttgta cacgtgttgc ttcgtccagt
1801 tacaaaccca ataaactctg tagagtgg
```

Translation:

MIGGLFIYNHKGEVLISRVYRDDIGRNAVDAFRVNVIHARQQVRSPVTNIARTSFFHV
KRSNIWLAAVTKQNVNAAMVFEFLYKMCDVMAAYFGKISEENIKNNFLLIYELLDEIL
DFGYPQNSETGALKTFITQQGIKSQHQTKEEQSQITSQVTGQIGWRREGIKYRRNELF
LDVLESVNLLMSPQGQVLSAHVSGRVVMKSYLSGMPECKFGMNDKIVIEKQGKGTADE
TSKSGKQSIAIDDCTFHQCVRLSKFDSERSISFIPPDGEFELMRYRTTKDIILPFRVI
PLVREVGRTKLEVKVVIKSNFKPSLLAQKIEVRIPTPLNTSGVQVICMKGKAKYKASE
NAIVWKIKRMAGMKESQISAEIELLPTNDKKKWARPPISMNFEVPFAPSGLKVRYLKV
FEPKLNYSDHDVIKWVRYIGRSGIYETRC

FIG. 36

Homo sapiens GLUT1 C-terminal binding protein (GLUT1CBP) mRNA

ORIGIN

```
   1 cacggggagg cggaggcagc ggcggcggcg gcggcggcgg cggcggcggc ggagcagatc
  61 ttctggtgac cccacttctc gctgctcatg ccgctgggac tggggcgccg gaaaaaggcg
 121 ccccctctag tggaaaatga ggaggctgag ccaggccgtg gagggctggg cgtgggggag
 181 ccagggcctt tgggcggagg tgggtcgggg ggcccccaaa tgggcttgcc ccccccctcc
 241 ccagccctgc ggccccgcct tgtgttccac acccagctgg cccatggcag tcccactggc
 301 cgcatcgagg ggttcaccaa cgtcaaggag ctgtatggca agattgccga ggccttccgc
 361 ctgccaactg ccgaggtgat gttttgcacc ctgaacaccc acaaagtgga catggacaag
 421 ctcctggggg gccaaatcgg gctggaggac ttcatcttcg cccacgtgaa ggggcagcgc
 481 aaggaggtgg aggtgttcaa gtcggaggat gcactcgggc tcaccatcac ggacaacggg
 541 gctggctacg ccttcatcaa gcgcatcaag gagggcagcg tgatcgacca catccacctc
 601 atcagcgtgg gcgacatgat cgaggccatt aacgggcaga gcctgctggg ctgccggcac
 661 tacgaagtgg cccggctgct caaggaactg ccccgaggcc gtaccttcac gctgaagctc
 721 acggagcctc gcaaggcctt cgacatgatc agccagcgtt cagcgggtgg ccgccctggc
 781 tctggcccac aactgggcac tggccgaggg accctgcggc tccgatcccg gggccccgcc
 841 acggtggagg atctgccctc tgcctttgaa gagaaggcca ttgagaaggt ggatgacctg
 901 ctggagagtt acatgggtat cagggacacg gagctggcgg ccaccatggt ggagctggga
 961 aaggacaaaa ggaacccgga tgagctggcc gaggccctgg acgaacggct gggtgacttt
1021 gccttccctg acgagttcgt ctttgacgtc tggggcgcca ttggggacgc caaggtcggc
1081 cgctactagg actgcccccg gaccctgcga tgatgacccg ggcgcaacct ggtgggggcc
1141 cccagcaggg acactgacgt caggacccga gcctccaagc ctgagcctag ctcagcagcc
1201 caaggacgat ggtgagggga ggtggggcca ggcccccctgc cccgctccaa tcggtaccat
1261 cccctccctg gttcccagtc tggccggggt ccccggcccc cctgtgccct gttccccacc
1321 ctacctcagc tggggtcagg cacagggaag gggagggatc agccaaattt gggcggccac
1381 ccccgcctcc accactttcc accatcagct gccaaactgg tccctctgtc tccctggggc
1441 cttgggttct gtttgggggt catgaccttc ctagtttcct gacgcaggga atacagggga
1501 gagggttgtc cttcccccca gcaaatgcaa taatgccctc acccctcctg agaggagccc
1561 cctccctgtg gagcctgtta cctccgcatt tgacacgagt tgctgtgaac cccgcaacct
1621 cctccccacc tcccatctct ccttccaggc ccatccctgg cccagagcag gagggaggga
1681 gggacgatgg cggtgggttt ttgtatctga atttgctgtc ttgaacataa agaatctatc
1741 tgctgttaaa aaaaaaaaaa aaaaa
```

Translation:

MPLGLGRRKKAPPLVENEEAEPGRGGLGVGEPGPLGGGGSGGPQMGLPPPPPALRPRL
VFHTQLAHGSPTGRIEGFTNVKELYGKIAEAFRLPTAEVMFCTLNTHKVDMDKLLGGQ
IGLEDFIFAHVKGQRKEVEVFKSEDALGLTITDNGAGYAFIKRIKEGSVIDHIHLISV
GDMIEAINGQSLLGCRHYEVARLLKELPRGRTFTLKLTEPRKAFDMISQRSAGGRPGS
GPQLGTGRGTLRLRSRGPATVEDLPSAFEEKAIEKVDDLLESYMGIRDTELAATMVEL
GKDKRNPDELAEALDERLGDFAFPDEFVFDVWGAIGDAKVGRY

FIG. 37

gp130 associated protein GAM

ORIGIN

```
       1 ggccgcccgg cgcccccagc agnccgagcc ggggcgcaca gncggggngc agaccgcgcc
      61 ccccgccgcg attgacatga tgtttccaca aagcaggcat tcgggctcct cgcacctacc
     121 ccagcaactc aaattcacca cctcggactc ctgcgaccgc atcaaagacg aatttcagct
     181 actgcaagct cagtaccaca gcctcaagct cgaatgtgac aagttggcca gtgagaagtc
     241 agagatgcag cgtcactatg tgatgtacta cgagatgtcc tacggcttga acatcgagat
     301 gcacaaacag gctgagatcg tcaaaaggct gaacgggatt tgtgcccagg tcctgcccta
     361 cctctcccaa gagcaccagc agcaggtctt gggagccatt gagagggcca agcaggtcac
     421 cgctcccgag ctgaactcta tcatccgaca gcagctccaa gcccaccagc tgtcccagct
     481 gcaggccctg gccctgccct tgaccccact acccgtgggg ctgcagccgc cttcgctgcc
     541 ggcggtcagc gcaggcaccg gcctcctctc gctgtccgcg ctgggttccc aggcccacct
     601 ctccaaggaa gacaagaacg ggcacgatgg tgacacccac caggaggatg atggcgagaa
     661 gtcggattag caggggccg ggacggggag gttgggaggg gggacagagg ggagacagag
     721 gcacggagag aaaggaatgt ttagcacaag acacagcgga gctcgggatg ggctaaactc
     781 ccatagtatt tatggtggcc gccggcgggg gccccagccc agcttgcagg ccacctctag
     841 ctttcttccc taccccattc ccggcttccc tcctcctccc tgcagcctgg ttaggtggat
     901 acctgccctg acatgtgagg caagctaagg cctggaggga cagctgggag accaggtccc
     961 aagggagcaa gacctcgcga agcgcagcag acccggccct ttccccgttt taggcatgtg
    1021 taaccgacag tctgcctggg ccacagccct ctcaacctgg tactgcatgc acgcaatgct
    1081 agctgccccc ttcccgtcct gggnaccccg agtctccccc gaccccgggt cccaggtatg
    1141 ctcccacctc cacctgcccc actcaccacc tctgctagtt ccagacacct ccacgcccac
    1201 ctggtcctct cctaccgcac acaaaagggg gggaacgagg gacgagctta gctgagctgg
    1261 gaggagcagg gtgagggtgg gcgacccagg attccccctc cccttcccaa ataaccc
```

Translation:

MFPQSRHSGSSHLPQQLKFTTSDSCDRIKDEFQLLQAQYHSLKLECDKLASEKSEMQR
HYVMYYEMSYGLNIEMHKQAEIVKRLNGICAQVLPYLSQEHQQQVLGAIERAKQVTAP
ELNSIIRQQLQAHQLSQLQALALPLTPLPVGLQPPSLPAVSAGTGLLSLSALGSQAHL
SKEDKNGHDGDTHQEDDGEKSD

FIG. 38

Homo sapiens amino-terminal enhancer of split (AES) mRNA

ORIGIN

```
        1 ggccgcccgg cgcccccagc agnccgagcc ggggcgcaca gncggggcgc agcccgcgcc
       61 ccccgccgcg attgacatga tgtttccaca aagcaggcat tcgggctcct cgcacctacc
      121 ccagcaactc aaattcacca cctcggactc ctgcgaccgc atcaaagacg aatttcagct
      181 actgcaagct cagtaccaca gcctcaagct cgaatgtgac aagttggcca gtgagaagtc
      241 agagatgcag cgtcactatg tgatgtacta cgagatgtcc tacggcttga acatcgagat
      301 gcacaaacag gctgagatcg tcaaaaggct gaacgggatt tgtgcccagg tcctgcccta
      361 cctctcccaa gagcaccagc agcaggtctt gggagccatt gagagggcca agcaggtcac
      421 cgctcccgag ctgaactcta tcatccgaca gcagctccaa gcccaccagc tgtcccagct
      481 gcaggccctg gccctgccct tgaccccact acccgtgggg ctgcagccgc cttcgctgcc
      541 ggcggtcagc gcaggcaccg gcctcctctc gctgtccgcg ctgggttccc aggcccacct
      601 ctccaaggaa gacaagaacg ggcacgatgg tgacacccac caggaggatg atggcgagaa
      661 gtcggattag caggggccg ggacagggag gttgggaggg gggacagagg ggagacagag
      721 gcacggagag aaaggaatgt ttagcacaag acacagcgga gctcgggatt ggctaatctc
      781 ccatagtatt tatggtggcg ccggcggggc cccagcccag cttgcaggcc acctctagct
      841 ttcttcctac cccattccgg cttccctcct cctcccctgc agcctggtta ggtggatacc
      901 tgccctgaca tgtgaggcaa gctaaggcct ggagggtcag atgggagacc aggtcccaag
      961 ggagcaagac ctgcgaagcg cagcagcccc ggcccttccc ccgttttgaa catgtgtaac
     1021 cgacagtctg ccctgggcca cagccctctc accctggtac tgcatgcacg caatgctagc
     1081 tgccccttc ccgtcctggg caccccgagt ctcccccgac cccgggtccc aggtatgctc
     1141 ccacctccac ctgccccact caccacctct gctagttcca gacacctcca cgcccacctg
     1201 gtcctctccc atcgcccaca aaaggggggg cacgagggac gagcttagct gagctgggag
     1261 gagcagggtg agggtgggcg acccaggatt ccccctcccc ttcccaaata aagatgaggg
     1321 tact
```

Translation:

MMFPQSRHSGSSHLPQQLKFTTSDSCDRIKDEFQLLQAQYHSLKLECDKLASEKSEMQ
RHYVMYYEMSYGLNIEMHKQAEIVKRLNGICAQVLPYLSQEHQQQVLGAIERAKQVTA
PELNSIIRQQLQAHQLSQLQALALPLTPLPVGLQPPSLPAVSAGTGLLSLSALGSQAH
LSKEDKNGHDGDTHQEDDGEKSD

FIG. 39

Antiquitin 1 (antiquitin=26g turgor protein homolog), mRNA

ORIGIN

```
   1 cctgctccaa ggtccagaga gctttctggt ctttgcagca ggcctgccgc cttcatgtcc
  61 actctcctca tcaatcagcc ccagtatgcg tggctgaaag agctggggct ccgcgaggaa
 121 aacgagggcg tgtataatgg aagctgggga ggccggggag aggttattac gacctattgc
 181 cccgctaaca acgagccaat agcaagagtc cgacaggcca gtgtggcaga ctatgaagaa
 241 actgtaaaga aagcaagaga agcatggaaa atctgggcag atattcctgc tccaaaacga
 301 ggagaaatag taagacagat tggcgatgcc ttgcgggaga agatccaagt actaggaagc
 361 ttggtgtctt tggagatggg gaaaatctta gtggaaggtg tgggtgaagt tcaggagtat
 421 gtggatatct gtgactatgc tgttggttta tcaaggatga ttggaggacc tatcttgcct
 481 tctgaaagat ctggccatgc actgattgag cagtggaatc ccgtaggcct ggttggaatc
 541 atcacggcat tcaatttccc tgtggcagtg tatggttgga acaacgccat cgccatgatc
 601 tgtggaaatg tctgcctctg gaaaggagct ccaaccactt ccctcattag tgtggctgtc
 661 acaaagataa tagccaaggt tctggaggac aacaagctgc ctggtgcaat ttgttccttg
 721 acttgtggtg gagcagatat tggcacagca atggccaaag atgaacgagt gaacctgctg
 781 tccttcactg ggagcactca ggtgggaaaa caggtgggcc tgatggtgca ggagaggttt
 841 gggagaagtc tgttggaact tggaggaaac aatgccatta ttgcctttga agatgcagac
 901 ctcagcttag ttgttccatc agctctcttc gctgctgtgg gaacagctgg ccagaggtgt
 961 accactgcga ggcgactgtt tatacatgaa agcatccatg atgaggttgt aaacagactt
1021 aaaaaggcct atgcacagat ccgagttggg aacccatggg accctaatgt tctctatggg
1081 ccactccaca ccaagcaggc agtgagcatg tttcttggag cagtggaaga agcaaagaaa
1141 gaaggtggca cagtggtcta tgggggcaag gttatggatc gccctggaaa ttatgtagaa
1201 ccgacaattg tgacaggtct tggccacgat gcgtccattg cacacacaga gactttcgct
1261 ccgattctct atgtctttaa attcaagaat gaagaagagg tctttgcatg gaataatgaa
1321 gtaaaacagg gactttcaag tagcatcttt accaaagatc tgggcagaat ctttcgctgg
1381 cttggaccta aaggatcaga ctgtggcatt gtaaatgtca acattccaac aagtggggct
1441 gagattggag gtgcctttgg aggagaaaag cacactggtg gtggcaggga gtctggcagt
1501 gatgcctgga aacagtacat gagaaggtct acttgtacta tcaactacag taaagacctt
1561 cctctggccc aaggaatcaa gtttcagtaa aggtgtttta gatgaacatc ccttaatttg
1621 aggtgttcca gcagctgttt ttggagaaga caaagaagat taaagttttc cctgaataaa
1681 tgcattatta tgactgtgac agtgactaat ccccctatga ccccaaagcc ctgattaaat
1741 caagagattc ctttttaaa aatcaaaata aaattgttac aacatagcca tagttactaa
1801 aaaaaaaaa
```

Translation:

```
MSTLLINQPQYAWLKELGLREENEGVYNGSWGGRGEVITTYCPANNEPIARVRQASVA
DYEETVKKAREAWKIWADIPAPKRGEIVRQIGDALREKIQVLGSLVSLEMGKILVEGV
GEVQEYVDICDYAVGLSRMIGGPILPSERSGHALIEQWNPVGLVGIITAFNFPVAVYG
WNNAIAMICGNVCLWKGAPTTSLISVAVTKIIAKVLEDNKLPGAICSLTCGGADIGTA
MAKDERVNLLSFTGSTQVGKQVGLMVQERFGRSLLELGGNNAIIAFEDADLSLVVPSA
LFAAVGTAGQRCTTARRLFIHESIHDEVVNRLKKAYAQIRVGNPWDPNVLYGPLHTKQ
AVSMFLGAVEEAKKEGGTVVYGGKVMDRPGNYVEPTIVTGLGHDASIAHTETFAPILY
VFKFKNEEEVFAWNNEVKQGLSSSIFTKDLGRIFRWLGPKGSDCGIVNVNIPTSGAEI
GGAFGGEKHTGGGRESGSDAWKQYMRRSTCTINYSKDLPLAQGIKFQ
```

FIG. 40

ARP2/3 protein COMPLEX 41 KD SUBUNIT (P41-ARC), mRNA

ORIGIN

```
   1 ggcacgaggg agcccagagc cggttcggcg cgtcgactgc ccagagtccg cggccggggc
  61 gcgggaggag ccaagccgcc atggcctacc acagcttcct ggtggagccc atcagctgcc
 121 acgcctggaa caaggaccgc acccagattg ccatctgccc caacaaccat gaggtgcata
 181 tctatgaaaa gagcggtgcc aaatggacca aggtgcacga gctcaaggag cacaacgggc
 241 aggtgacagg catcgactgg gcccccgaga gtaaccgtat tgtgacctgc ggcacagacc
 301 gcaacgccta cgtgtggacg ctgaagggcc gcacatggaa gcccacgctg gtcatcctgc
 361 ggatcaaccg ggctgcccgc tgcgtgcgct gggcccccaa cgagaacaag tttgctgtgg
 421 gcagcggctc tcgtgtgatc tccatctgtt atttcgagca ggagaatgac tggtgggttt
 481 gcaagcacat caagaagccc atccgctcca ccgtcctcag cctggactgg caccccaaca
 541 atgtgctgct ggctgccggc tcctgtgact tcaagtgtcg gatcttttca gcctacatca
 601 aggaggtgga ggaacggccg gcacccaccc cgtggggctc caagatgccc tttggggaac
 661 tgatgttcga atccagcagt agctgcggct gggtacatgg cgtctgtttc tcagccagcg
 721 ggagccgcgt ggcctgggta agccacgaca gcaccgtctg cctggctgat gccgacaaga
 781 agatggccgt cgcgactctg gcctctgaaa cactaccact gctggcgctg accttcatca
 841 cagacaacag cctggtggca gcgggccacg actgcttccc ggtgctgttc acctatgacg
 901 ccgccgcggg gatgctgagc ttcggcgggc ggctggacgt tcctaagcag agctcgcagc
 961 gtggcttgac ggcccgcgag cgcttccaga acctggacaa gaaggcgagc tccgagggtg
1021 gcacggctgc gggcgcgggc ctagactcgc tgcacaagaa cagcgtcagc cagatctcgg
1081 tgctcagcgg cggcaaggcc aagtgctcgc agttctgcac cactggcatg gatggcggca
1141 tgagtatctg ggatgtgaag agcttggagt cagccttgaa ggacctcaag atcaaatgac
1201 ctgtgaggaa tatgttgcct tcatcctaac tgctggggaa gcggggagag gggtcaggga
1261 ggctaatggt tgctttgctg aatgtttctg gggtaccaat acgagttccc atagggggctg
1321 ctccctcaaa aagggagggg acagatgggg agcttttctt acctattcaa ggaatacgtg
1381 ccttttttctt aaatgctttc atttattgaa aaaaaaaaaa aaaaaaaa
```

Translation:

```
MAYHSFLVEPISCHAWNKDRTQIAICPNNHEVHIYEKSGAKWTKVHELKEHNGQVTGI
DWAPESNRIVTCGTDRNAYVWTLKGRTWKPTLVILRINRAARCVRWAPNENKFAVGSG
SRVISICYFEQENDWWVCKHIKKPIRSTVLSLDWHPNNVLLAAGSCDFKCRIFSAYIK
EVEERPAPTPWGSKMPFGELMFESSSSCGWVHGVCFSASGSRVAWVSHDSTVCLADAD
KKMAVATLASETLPLLALTFITDNSLVAAGHDCFPVLFTYDAAAGMLSFGGRLDVPKQ
SSQRGLTARERFQNLDKKASSEGGTAAGAGLDSLHKNSVSQISVLSGGKAKCSQFCTT
GMDGGMSIWDVKSLESALKDLKIK
```

FIG. 41a

H.sapiens seb4D mRNA

```
ORIGIN
        1 gagcgcgggt ttctcgcggc ccctggccgc ccccggcgtc atgtacggct cgcagaaggg
       61 caccacgttc accaagatct tcgtgggcgg cctgccgtac cacactaccg acgcctcgct
      121 caggaagtac ttcgagggct tcggcgacat cgaggaggcc gtggtcatca ccgaccgcca
      181 gacgggcaag tcccgcggct acggcttcgt gaccatggcc gaccgggcgg cagctgagag
      241 ggcttgcaaa gaccctaacc ccatcatcga cggccgcaag gccaacgtga acctggcata
      301 tctgggcgcc aagccttggt gtctccagac gggctttgcc attggcgtgc agcagctgca
      361 ccccaccttg atccagcgga cttacgggct gaccccgcac tacatctacc caccagccat
      421 cgtgcagccc agcgtggtga tcccagccgc ccctgtcccg tcgctgtcct cgccctacat
      481 tgagtacacg ccggccagcc cggtctacgc ccagtaccca ccggccacct atgaccagta
      541 cccatacgcc gcctcgcctg ccacggctga cagcttcgtg ggctacagct accctgccgc
      601 cgtgcaccag gccctctcag ccgcagcacc cgcgggcacc actttcgtgc agtaccaggc
      661 gccgcagctg cagcctgaca ggatgcagtg aggggcgttc ctgccccgag gactgtggca
      721 ttgtcacctt cacagcagac agagctgcca ggccatgatg ggctggcgac agcccggctg
      781 agcttcagtg aggtgccacc agcacccgtg cctccgaaga ccgctcgggc attccgcctg
      841 cgccctggga cagcggagag acggcttctc tttaatctag gtcccattgt gtcttgaggg
      901 aggactttta agaatgactg agaactattt aaagacgcaa tcccaggttc cttgcacacc
      961 atggcagcct ctccttgcac cttctcctgc ctctccacac tccaggttcc ctcaggcttg
     1021 tgtccccact gctgcatcgt ggcggggtgt cacagaccct ctgcagcccc tggctgccct
     1081 ggactgtgca gagatgcctg actccaggga aacctgaaag caagaagtta atggactgtt
     1141 tattgtaact tgatcctccc gagctgtgag cgcagtctga ggtctgagga cacggcctcc
     1201 tgttggagtc ccatttctc catcagggca cgtgggcggc ttcctcaagc ccggaggagc
     1261 tcccaggcgc acaggggccg ccggtaacag gggccgccgg ccaaaggccc ctttccagtc
     1321 atagcactga agttgcaact tttttcttgt aattgttttg ctactaagat aatttcagaa
     1381 gttcagtcta ttttttcagc ggatactgcc gccaccaaga atccaaacct aggaa
```

Translation:

SAGFSRPLAAPGVMYGSQKGTTFTKIFVGGLPYHTTDASLRKYFEGFGDIEEAVVITD
RQTGKSRGYGFVTMADRAAAERACKDPNPIIDGRKANVNLAYLGAKPWCLQTGFAIGV
QQLHPTLIQRTYGLTPHYIYPPAIVQPSVVIPAAPVPSLSSPYIEYTPASPVYAQYPP
ATYDQYPYAASPATADSFVGYSYPAAVHQALSAAAPAGTTFVQYQAPQLQPDRMQ

FIG. 41b

H.sapiens seb4B mRNA

ORIGIN

```
   1 gcggcggatg cagtacaacc ggcgctttgt caacgttgtg cccacctttg gcaagaagaa
  61 gggcaccacg ttcaccaaga tcttcgtggg cggcctgccg taccacacta ccgacgcctc
 121 gctcaggaag tacttcgagg gcttcggcga catcgaggag gccgtggtca tcaccgaccg
 181 ccagacgggc aagtcccgcg gctacggctt cgtgaccatg gccgaccggg cggcagctga
 241 gagggcttgc aaagacccta accccatcat cgacggccgc aaggccaacg tgaacctggc
 301 atatctgggc gccaagcctt ggtgtctcca gacgggcttt gccattggcg tgcagcagct
 361 gcaccccacc ttgatccagc ggacttacgg gctgaccccg cactacatct acccaccagc
 421 catcgtgcag cccagcgtgg tgatcccagc cgcccctgtc ccgtcgctgt cctcgcccta
 481 cattgagtac acgccggcca gcccggtcta cgcccagtac ccaccggcca cctatgacca
 541 gtacccatac gccgcctcgc ctgccacggc tgacagcttc gtgggctaca gctaccctgc
 601 cgccgtgcac caggccctct cagccgcagc acccgcgggc accactttcg tgcagtacca
 661 ggcgccgcag ctgcagcctg acaggatgca gtgaggggcg ttcctgcccc gaggactgtg
 721 gcattgtcac cttcacagca gacagagctg ccaggccatg atgggctggc gacagcccgg
 781 ctgagcttca gtgaggtgcc accagcaccc gtgcctccga agaccgctcg ggcattccgc
 841 ctgcgccctg ggacagcgga gagacggctt ctctttaatc taggtcccat tgtgtcttga
 901 gggaggactt ttaagaatga ctgagaacta tttaaagacg caatcccagg ttccttgcac
 961 accatggcag cctctccttg caccttctcc tgcctctcca cactccaggt tccctcaggc
1021 ttgtgtcccc actgctgcat cgtggcgggg tgtcacagac cctctgcagc ccctggctgc
1081 cctggactgt gcagagatgc ctgactccag ggaaacctga aagcaagaag ttaatggact
1141 gtttattgta acttgatcct cccgagctgt gagcgcagtc tgaggtctga ggacacggcc
1201 tcctgttgga gtcccatttt ctccatcagg gcacgtgggc ggcttcctca agcccggagg
1261 agctcccagg cgcacagggg ccgccggtaa caggggccgc cggccaaagg cccctttcca
1321 gtcatagcac tgaagttgca actttttct tgtaattgtt ttgctactaa gataatttca
1381 gaagttcagt ctattttttc agcggatact gccgccacca agaatccaaa cctaggaa
```

Translation:

RRMQYNRRFVNVVPTFGKKKGTTFTKIFVGGLPYHTTDASLRKYFEGFGDIEEAVVIT
DRQTGKSRGYGFVTMADRAAAERACKDPNPIIDGRKANVNLAYLGAKPWCLQTGFAIG
VQQLHPTLIQRTYGLTPHYIYPPAIVQPSVVIPAAPVPSLSSPYIEYTPASPVYAQYP
PATYDQYPYAASPATADSFVGYSYPAAVHQALSAAAPAGTTFVQYQAPQLQPDRMQ

FIG. 42

Homo sapiens lamin A/C (LMNA) mRNA

ORIGIN

```
       1 actcagtgtt cgcgggagcc gcacctacac cagccaaccc agatcccgag gtccgacagc
      61 gcccggccca gatccccacg cctgccagga gcaagccgag agccagccgg ccggcgcact
     121 ccgactccga gcagtctctg tccttcgacc cgagccccgc gcccttccg ggacccctgc
     181 cccgcgggca gcgctgccaa cctgccggcc atggagaccc cgtcccagcg gcgcgccacc
     241 cgcagcgggg cgcaggccag ctccactccg ctgtcgccca cccgcatcac ccggctgcag
     301 gagaaggagg acctgcagga gctcaatgat cgcttggcgg tctacatcga ccgtgtgcgc
     361 tcgctggaaa cggagaacgc agggctgcgc cttcgcatca ccgagtctga agaggtggtc
     421 agccgcgagg tgtccggcat caaggccgcc tacgaggccg agctcgggga tgcccgcaag
     481 acccttgact cagtagccaa ggagcgcgcc cgcctgcagc tggagctgag caaagtgcgt
     541 gaggagttta aggagctgaa agcgcgcaat accaagaagg agggtgacct gatagctgct
     601 caggctcggc tgaaggacct ggaggctctg ctgaactcca aggaggccgc actgagcact
     661 gctctcagtg agaagcgcac gctggagggc gagctgcatg atctgcgggg ccaggtggcc
     721 aagcttgagg cagccctagg tgaggccaag aagcaacttc aggatgagat gctgcggcgg
     781 gtggatgctg agaacaggct gcagaccatg aaggaggaac tggacttcca gaagaacatc
     841 tacagtgagg agctgcgtga gaccaagcgc cgtcatgaga cccgactggt ggagattgac
     901 aatgggaagc agcgtgagtt tgagagccgg ctggcggatg cgctgcagga actgcgggcc
     961 cagcatgagg accaggtgga gcagtataag aaggagctgg agaagactta ttctgccaag
    1021 ctggacaatg ccaggcagtc tgctgagagg aacagcaacc tggtgggggc tgcccacgag
    1081 gagctgcagc agtcgcgcat ccgcatcgac agcctctctg cccagctcag ccagctccag
    1141 aagcagctgg cagccaagga ggcgaagctt cgagacctgg aggactcact ggcccgtgag
    1201 cgggacacca gccggcggct gctggcggaa aaggagcggg agatggccga gatgcgggca
    1261 aggatgcagc agcagctgga cgagtaccag gagcttctgg acatcaagct ggccctggac
    1321 atggagatcc acgcctaccg caagctcttg gagggcgagg aggagaggct acgcctgtcc
    1381 cccagcccta cctcgcagcg cagccgtggc cgtgcttcct ctcactcatc ccagacacag
    1441 ggtgggggca gcgtcaccaa aaagcgcaaa ctggagtcca ctgagagccg cagcagcttc
    1501 tcacagcacg cacgcactag cgggcgcgtg gccgtggagg aggtggatga ggagggcaag
    1561 tttgtccggc tgcgcaacaa gtccaatgag gaccagtcca tgggcaattg gcagatcaag
    1621 cgccagaatg gagatgatcc cttgctgact taccggttcc caccaaagtt caccctgaag
    1681 gctgggcagg tggtgacgat ctgggctgca ggagctgggg ccacccacag ccccctacc
    1741 gacctggtgt ggaaggcaca gaacacctgg ggctgcggga acagcctgcg tacggctctc
    1801 atcaactcca ctggggaaga agtggccatg cgcaagctgg tgcgctcagt gactgtggtt
    1861 gaggacgacg aggatgagga tggagatgac ctgctccatc accaccatgt gagtggtagc
    1921 cgccgctgag gccgagcctg cactggggcc acccagccag gcctgggggc agcctctccc
    1981 cagcctcccc gtgccaaaaa tcttttcatt aaagaatgtt tggaacttt
```

Translation:

METPSQRRATRSGAQASSTPLSPTRITRLQEKEDLQELNDRLAVYIDRVRSLETENAG
LRLRITESEEVVSREVSGIKAAYEAELGDARKTLDSVAKERARLQLELSKVREEFKEL
KARNTKKEGDLIAAQARLKDLEALLNSKEAALSTALSEKRTLEGELHDLRGQVAKLEA
ALGEAKKQLQDEMLRRVDAENRLQTMKEELDFQKNIYSEELRETKRRHETRLVEIDNG
KQREFESRLADALQELRAQHEDQVEQYKKELEKTYSAKLDNARQSAERNSNLVGAAHE
ELQQSRIRIDSLSAQLSQLQKQLAAKEAKLRDLEDSLARERDTSRRLLAEKEREMAEM
RARMQQQLDEYQELLDIKLALDMEIHAYRKLLEGEEERLRLSPSPTSQRSRGRASSHS
SQTQGGGSVTKKRKLESTESRSSFSQHARTSGRVAVEEVDEEGKFVRLRNKSNEDQSM
GNWQIKRQNGDDPLLTYRFPPKFTLKAGQVVTIWAAGAGATHSPPTDLVWKAQNTWGC
GNSLRTALINSTGEEVAMRKLVRSVTVVEDDEDEDGDDLLHHHHVSGSRR